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# The M. A. C. Bulletin

Amherst, Mass.

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1917

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# THE M. A. C. BULLETIN

AMHERST, MASS.

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# CATALOGUE

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE,

1916-1917.

## FIFTY-FOURTH ANNUAL REPORT.

PART II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1917.

> Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

# MASSACHUSETTS AGRICULTURAL COLLEGE,

## AMHERST.

## CATALOGUE, 1916-1917.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1917.

Publication of this Document
approved by the
Supervisor of Administration.

# The Commonwealth of Massachusetts.

Massachusetts Agricultural College,
Amherst, Dec. 1, 1916.

To His Excellency Samuel W. McCall.

Sir: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part II. of the fifty-fourth annual report of the trustees, this being the catalogue of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
*President.*

# THE MASSACHUSETTS AGRICULTURAL COLLEGE.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow. When deemed necessary, additional announcements are made in a supplementary bulletin, published in the spring.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue. Special publication will be made should it become necessary on account of important changes.

# CALENDAR.

## 1917-18.

### REGULAR COURSES.

#### 1917.

| | |
|---|---|
| January 2, 7.30 A.M., | Winter term begins; chapel. |
| February 22, Thursday afternoon, | Half holiday, Washington's Birthday. |
| March 23, Friday, 5 P.M., | Winter term ends. |
| April 2, Monday, 12.40 P.M., | Spring term begins; chapel. |
| April 19, Thursday afternoon, | Half holiday, Patriots' Day. |
| May 30, Wednesday, | Holiday, Memorial Day. |
| June 23–27, Saturday–Wednesday, | Commencement. |
| June 27, Wednesday, | Spring term ends. |
| June 28–30, Thursday–Saturday, | Entrance examinations. |
| July 2, Monday, | Summer term begins. |
| September 14, Friday, | Summer term ends. |
| September 12–15, Wednesday–Saturday, | Entrance examinations. |
| September 19, Wednesday, 1.30 P.M., | Fall term begins; chapel. |
| October 12, Friday afternoon, | Half holiday, Columbus Day. |
| November 28, Wednesday, 12 M.–Friday, November 30, 1 P.M., | Thanksgiving recess. |
| December 21, Friday, 5 P.M., | Fall term ends. |
| December 31, Monday, 12.40 P.M., | Winter term begins; chapel. |

#### 1918.

| | |
|---|---|
| February 22, Friday afternoon, | Half holiday, Washington's Birthday. |
| March 22, Friday, 5 P.M. | Winter term ends. |
| April 1, Monday, 12.40 P.M., | Spring term begins; chapel. |
| April 19, Friday afternoon, | Half holiday, Patriot's Day. |
| May 30, Thursday, | Holiday, Memorial Day. |
| June 22–26, Saturday–Wednesday, | Commencement. |
| June 26, Wednesday, | Spring term ends. |
| June 27–29, Thursday–Saturday, | Entrance examinations. |
| July 1, Monday, | Summer term begins. |
| September 18–21, Wednesday–Saturday, | Entrance examinations. |
| September 20, Friday, | Summer term ends. |
| September 25, Wednesday, 1.30 P.M., | Fall term begins; chapel. |

# MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of nearly all the buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the Federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the Federal station, and subsequently the whole was incorporated with the college.

COURSES. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-year[1] course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science, doctor of philosophy and master of agriculture. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and summer school. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, educational exhibits, lecture courses, demonstrations and circulating libraries.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, for scientific experts in chemistry, entomology, botany and microbiology and for business operations having connection with practical agriculture.

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[1] Twenty-seven teaching departments offer instruction in agriculture, horticulture, sciences, the humanities and rural social science. A system of major courses permits a student to elect major work in 1 of 17 departments, specializing in that and allied subjects for a period of two years.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, botany and zoölogy, are an essential preparation. Still other students find the course a desirable education, without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which a major course is offered.

Location and Equipment. — The agricultural college is located in the town of Amherst. The grounds comprise more than 600 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

# THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was then without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college, and was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about one-half of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to a committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, experimentation and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

# THE CORPORATION.

## ORGANIZATION OF 1917.

### MEMBERS OF THE CORPORATION.

| | TERM EXPIRES |
|---|---|
| CHARLES H. PRESTON of Danvers, | 1918 |
| FRANK A. HOSMER of Amherst, | 1918 |
| DAVIS R. DEWEY of Cambridge, | 1919 |
| JOHN F. GANNON of Worcester, | 1919 |
| ARTHUR G. POLLARD of Lowell, | 1920 |
| GEORGE H. ELLIS of West Newton, | 1920 |
| ELMER D. HOWE of Marlborough, | 1921 |
| EDMUND MORTIMER of Grafton, | 1921 |
| NATHANIEL I. BOWDITCH of Framingham, | 1922 |
| WILLIAM WHEELER of Concord, | 1922 |
| CHARLES A. GLEASON of New Braintree, | 1923 |
| JAMES F. BACON of Boston, | 1923 |
| FRANK GERRETT of Greenfield, | 1924 |
| HAROLD L. FROST of Arlington, | 1924 |

### MEMBERS EX OFFICIO.

His Excellency Governor SAMUEL W. MCCALL, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
PAYSON SMITH, *State Commissioner of Education.*
WILFRID WHEELER, *Secretary of the State Board of Agriculture.*

### OFFICERS OF THE CORPORATION.

His Excellency Governor SAMUEL W. MCCALL of Boston, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
WILFRID WHEELER of Concord, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

### STANDING COMMITTEES OF THE CORPORATION.[1]

*Committee on Finance.*

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
FRANK A. HOSMER.
EDMUND MORTIMER.

*Committee on Course of Study and Faculty.*

WILLIAM WHEELER, *Chairman.*
FRANK A. HOSMER.
ELMER D. HOWE.
PAYSON SMITH.
DAVIS R. DEWEY.
JOHN F. GANNON.
JAMES F. BACON.

*Committee on Farm.*

NATHANIEL I. BOWDITCH, *Chairman.*
FRANK GERRETT.
GEORGE H. ELLIS.
EDMUND MORTIMER.

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[1] The president of the college is ex-officio member of each standing committee.

*Committee on Horticulture.*

Harold L. Frost, *Chairman.*
Charles A. Gleason.
Elmer D. Howe.
Wilfrid Wheeler.

*Committee on Experiment Department.*[1]

Charles H. Preston, *Chairman.*
Wilfrid Wheeler.
Arthur G. Pollard.
Harold L. Frost.
Edmund Mortimer.

*Committee on Buildings and Arrangement of Grounds.*

Frank Gerrett, *Chairman.*
William Wheeler.
Charles H. Preston.
George H. Ellis.
James F. Bacon.

*Committee on Extension Service.*

Elmer D. Howe, *Chairman.*
George H. Ellis.
Harold L. Frost.
Davis R. Dewey.
Wilfrid Wheeler.
John F. Gannon.

*Examining Committee of Overseers from the State Board of Agriculture.*

John Bursley of West Barnstable.
Frank P. Newkirk of Easthampton.
William E. Patrick of Warren.
John J. Erwin of Wayland.
Charles W. Freehan of Great Barrington.

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[1] The director of the experiment station is a member of the committee on experiment department, without vote.

# OFFICERS OF THE INSTITUTION.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the College, not upon seniority of appointment to the position now held.]

## THE FACULTY.

Kenyon L. Butterfield, A.M., LL.D., . . . . . . . President's House.
President of the College and Head of Division of Rural Social Science.

Charles H. Fernald, Ph.D., . . . . . . . . . . 3 Hallock Street.
Honorary Director of the Graduate School.

Edward M. Lewis, A.M., . . . . . . . . . . 19 Lincoln Avenue.
Dean of the College and Professor of Languages and Literature.

Fred C. Kenney, . . . . . . . . . . . Mount Pleasant.
Treasurer of the College.

William P. Brooks, Ph.D., . . . . . . . . . . 6 Farview Way.
Director of the Experiment Station and Lecturer on Soil Fertility.

William D. Hurd, M.Agr., . . . . . . . . . . 46 Amity Street.
Director of the Extension Service and Supervisor of Short Courses.

Charles E. Marshall, Ph.D., . . . . . . . . . 44 Sunset Avenue.
Director of the Graduate School and Professor of Microbiology.

Frank A. Waugh, M.Sc., . . . . . . . . . . . . . Campus.
Head of Division of Horticulture and Professor of Landscape Gardening.

James A. Foord,[1] M.Sc.Agr., . . . . . . . . . . 54 Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Administration.

Robert J. Sprague, Ph.D., . . . . . . . . . . . Mount Pleasant.
Head of Division of Humanities and Professor of Economics and Sociology.

Joseph B. Lindsey, Ph.D., . . . . . . . . . . 47 Lincoln Avenue.
Goessmann Professor of Chemistry.

Charles Wellington, Ph.D., . . . . . . . . . 34 Amity Street.
Professor of Chemistry.

James B. Paige, B.Sc., D.V.S., . . . . . . . . . 42 Lincoln Avenue.
Professor of Veterinary Science.

Philip B. Hasbrouck, B.Sc., . . . . . . . . . 130 Pleasant Street.
Registrar of the College and Professor of Physics.

John E. Ostrander, A.M., C.E., . . . . . . . . 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

Henry T. Fernald, Ph.D., . . . . . . . . . . 44 Amity Street.
Professor of Entomology, Chairman of Division of Science.

A. Vincent Osmun, M.Sc., . . . . . . . . . . 5 Kendrick Place.
Professor of Botany.

William R. Hart, A.M., LL.B., . . . . . . . . . 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears,[2] M.Sc., . . . . . . . . . . Mount Pleasant.
Professor of Pomology.

William P. B. Lockwood, M.Sc., . . . . . . . . 34 North Prospect Street.
Professor of Dairying.

Alexander E. Cance, Ph.D., . . . . . . . . . 9 Fearing Street.
Professor of Agricultural Economics.

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[1] On leave, Jan. 15, 1917–Jan. 14, 1918.

[2] On leave, first term, 1916–17.

| | |
|---|---|
| Joseph S. Chamberlain, Ph.D.,<br>Professor of Organic and Agricultural Chemistry. | Mount Pleasant. |
| John C. Graham, B.Sc.Agr.,<br>Professor of Poultry Husbandry. | Lincoln Avenue. |
| G. Chester Crampton, Ph.D.,<br>Professor of Insect Morphology. | 10 Allen Street. |
| Charles A. Peters, Ph.D.,<br>Professor of Inorganic and Soil Chemistry. | 2 Sunset Avenue. |
| Curry S. Hicks, B.Pd.,<br>Professor of Physical Education and Hygiene. | 8 Allen Street. |
| William D. Clark, A.B., M.F.,<br>Professor of Forestry. | 3 Mount Pleasant. |
| Ernest Anderson, Ph.D.,<br>Professor of General and Physical Chemistry. | 3 Phillips Street. |
| Christian I. Gunness, B.Sc.,<br>Professor of Rural Engineering. | 105 Butterfield Road. |
| Henry W. Fleet, Captain, U. S. A.,<br>Professor of Military Science and Tactics. | 5 Phillips Street. |
| Harold F. Tompson, B.Sc.,<br>Professor of Market Gardening. | 10 Temple Street, Arlington. |
| John Phelan, A.M.,<br>Professor of Rural Sociology. | 29 Northampton Road. |
| John C. McNutt, B.Sc.Agr.,<br>Professor of Animal Husbandry. | 33 East Pleasant Street. |
| Clarence E. Gordon, Ph.D.,<br>Associate Professor of Zoölogy and Geology. | 38 Lincoln Avenue. |
| Robert W. Neal, A.M.,<br>Associate Professor of English. | 15 Spring Street. |
| Edgar L. Ashley, A.M.,<br>Associate Professor of German. | 24 Pleasant Street. |
| Alexander A. Mackimmie, A.M.,<br>Associate Professor of French. | Pine Street, North Amherst. |
| Burton N. Gates, Ph.D.,<br>Associate Professor of Beekeeping. | 42 Lincoln Avenue. |
| George E. Gage, Ph.D.,<br>Associate Professor of Animal Pathology. | 27 Sunset Avenue. |
| Walter W. Chenoweth, A.B., M.Sc.,<br>Associate Professor of Pomology. | North Amherst. |
| F. H. Hesselink van Suchtelen, Ph.D.,<br>Associate Professor of Microbiology. | 30 North Prospect Street. |
| Arno H. Nehrling,<br>Associate Professor of Floriculture. | 5 Kendrick Place. |
| Paul J. Anderson, Ph.D.,<br>Associate Professor of Botany. | 24 Pleasant Street. |
| Ralph J. Watts, B.Sc.,<br>Secretary of the College. | 101 Butterfield Road. |
| Charles R. Green, B.Agr.,<br>Librarian. | Mount Pleasant. |
| C. Robert Duncan, B.Sc., C.E.,<br>Assistant Professor of Mathematics. | 23 Lincoln Avenue. |
| Arthur K. Harrison,<br>Assistant Professor of Landscape Gardening. | 8 Allen Street. |
| Elvin L. Quaife, B.Sc.Agr.,<br>Assistant Professor of Animal Husbandry. | 103 Butterfield Road. |
| William L. Machmer, A.M., M.E.,<br>Assistant Professor of Mathematics. | 3 Kendrick Place. |
| Walter E. Prince, Ph.B., A.M.,<br>Assistant Professor of English. | 4 Kendrick Place. |
| Harold E. Robbins, B.Sc., A.M.,<br>Assistant Professor of Physics. | 4 Nutting Avenue. |
| Orton L. Clark, B.Sc.,<br>Assistant Professor of Botany. | 16 College Street. |
| Loyal F. Payne, B.Sc.,<br>Assistant Professor of Poultry Husbandry. | 12 Chestnut Street. |

| | |
|---|---|
| Earl Jones, M.Sc.,<br>Assistant Professor of Agronomy. | 3 Phillips Street. |
| Charles H. Thompson, M.Sc.,<br>Assistant Professor of Horticulture. | 77 South Pleasant Street. |
| Andrew S. Thomson, Ph.B., A.M.,<br>Assistant Professor of Market Gardening. | 10½ Kellogg Avenue. |
| Orville A. Jamison, M.Sc.,<br>Assistant Professor of Dairying. | 7 East Pleasant Street. |
| John T. Wheeler, B.Sc.Agr.,<br>Assistant Professor of Horticulture. | 13 Fearing Street. |
| Charles H. Patterson, A.B., A.M.,<br>Assistant Professor of English. | 54 Pleasant Street. |
| Frank W. Rane, M.F.,<br>Lecturer in Forestry. | Boston. |
| Helena T. Goessmann, M.Ph.,<br>Instructor in English. | 13 Main Street. |
| William L. Harmount, A.B.,<br>Instructor in French. | 86 Pleasant Street. |
| Arthur N. Julian, A.B.,<br>Instructor in German. | Farview Way. |
| Frederick A. McLaughlin,[1] B.Sc.,<br>Instructor in Botany. | 24 Pleasant Street. |
| Samuel Coons,<br>Instructor in Dairying. | 2 McClellan Street. |
| Harold M. Gore, B.Sc.,<br>Instructor in Physical Education. | 8 Allen Street. |
| Burt A. Hazeltine, B.Sc.,<br>Instructor in Mathematics. | 4 North Prospect Street. |
| William S. Regan, Ph.D.,<br>Instructor in Entomology. | 86 Pleasant Street. |
| Frank P. Rand, A.M.,<br>Instructor in English. | North Amherst. |
| Arao Itano, Ph.D.,<br>Instructor in Microbiology. | 7 East Pleasant Street. |
| Walter M. Peacock, M.S.Agr.,<br>Instructor in Farm Management. | 24 Pleasant Street. |
| George W. Martin, M.Sc.,<br>Instructor in Botany. | 7 Phillips Street. |
| Harry D. Drain, B.Sc.Agr.,<br>Instructor in Dairying. | 24 Pleasant Street. |
| Stanley C. Ball, Ph.D.,<br>Instructor in Zoölogy. | 45 Amity Street. |
| Ralph M. Rutledge, M.Sc.,<br>Instructor in Agricultural Economics. | 13 Fearing Street. |
| Everett H. Rucker, B.Sc., A.M.,<br>Instructor in Poultry Husbandry. | 5 School Street. |
| Charles H. Gould, B.Sc.,<br>Field Agent. | 4 Nutting Avenue. |
| William J. Fitzmaurice,<br>Assistant in Physical Education. | – – |
| Paul Serex, Jr., M.Sc.,<br>Assistant in Chemistry. | 116 Pleasant Street. |
| Frederick G. Merkle, B.Sc.,<br>Assistant in Agronomy. | . East Street. |
| Harry C. Thompson, B.Sc.,<br>Assistant in Physics. | 16 North Prospect Street. |
| Philip W. Payne, A.B.,[2]<br>Assistant in English. | 5 Kendrick Place. |
| Joseph Novitski,[2]<br>Assistant in Rural Sociology. | Pelham Road. |

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[1] On leave, 1916–17.

[2] Part time.

### Graduate Assistants.

Robert P. Armstrong, M.Sc., . . . . . . . . Phi Sigma Kappa House.
Department of Pomology, Experiment Station.

Roy C. Avery, B.Sc., . . . . . . . . . . . . 15 Spring Street.
Industrial Tests, Experiment Station.

Paul Beebe, A.B., . . . . . . . . . . . 45 Pleasant Street.
Department of Chemistry.

J. Stanley Cobb, B.Sc., . . . . . . . . . . 24 Pleasant Street.
Department of Agronomy.

Samual H. De Vault,[1] M.A., . . . . . . . . . 9 Fearing Street.
Department of Agricultural Economics, Experiment Station.

William L. Doran,[2] B.Sc., . . . . . . . . . . . Clark Hall.
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Ernest E. Fish, B.Sc., . . . . . . . . . . . 24 Pleasant Street.
Department of Animal Husbandry.

Egerton G. Hood, B.Sc., . . . . . . . . . . . 15 Spring Street.
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Satwaji G. Mutkekar, B.Agr., . . . . . . . . . . Farview Way.
Industrial Tests, Experiment Station.

Gerald E. Perry, B.Sc., . . . . . . . . . . . 17 Amity Street.
Department of Chemistry.

Arthur L. Prince, A.B., . . . . . . . . . . 4 Kendrick Place.
Department of Chemistry.

James A. Purington, B.Sc., . . . . . . . . . . 116 Pleasant Street.
Department of Agronomy.

George B. Ray, B.Sc., . . . . . . . . . . . East Pleasant Street.
Department of Microbiology.

Irving C. Root, B.Sc., . . . . . . . . . . . 24 Pleasant Street.
Department of Landscape Gardening.

Lloyd L. Stewart, B.Sc., . . . . . . . . . . 18 Nutting Avenue.
Department of Poultry Husbandry.

Stuart C. Vinal, B.Sc., . . . . . . . . . . 112 Pleasant Street.
Department of Entomology, Experiment Station.

Donald White, B.A., . . . . . . . . . . . 24 Pleasant Street.
Department of Botany.

Carrick E. Wildon, B.Sc., . . . . . . . . . . 66 Pleasant Street.
Department of Floriculture.

Elwin G. Wood, B.Sc., . . . . . . . . . . . Wilder Hall.
Department of Pomology.

## THE EXPERIMENT STATION STAFF.

### Administration.

William P. Brooks, Ph.D., . . . . . . . . . . . 6 Farview Way.
Director.

Joseph B. Lindsey, Ph.D., . . . . . . . . . . 47 Lincoln Avenue.
Vice-Director.

Fred C. Kenney, . . . . . . . . . . . Mount Pleasant.
Treasurer.

Charles R. Green, B.Agr., . . . . . . . . . . . Mount Pleasant.
Librarian.

### Department of Agricultural Economics.

Alexander E. Cance, Ph.D., . . . . . . . . . 9 Fearing Street.
In charge of Department.

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[1] Services began Jan. 9, 1917.

[2] Resigned, to take effect Nov. 20, 1916.

### Department of Agriculture.

William P. Brooks, Ph.D., . . . . . . . . . . 6 Farview Way.
Agriculturist.
Henry J. Franklin, Ph.D., . . . . . . . . . . . Wareham.
In charge of Cranberry Investigation.
Edwin F. Gaskill, B.Sc., . . . . . . . . . North Pleasant Street.
Assistant Agriculturist.
Robert L. Coffin, . . . . . . . . . . 19 Phillips Street.
Assistant.

### Department of Botany and Vegetable Pathology.

A. Vincent Osmun, M.Sc., . . . . . . . . . 5 Kendrick Place.
Botanist.
George H. Chapman, Ph.D., . . . . . . . . . Fearing Street.
Research Physiologist.
Paul J. Anderson, Ph.D., . . . . . . . . . 24 Pleasant Street.
Associate Plant Pathologist.
Orton L. Clark, B.Sc., . . . . . . . . . . 16 College Street.
Assistant Plant Physiologist.

### Department of Entomology.

Henry T. Fernald, Ph.D., . . . . . . . . . . 44 Amity Street.
Entomologist.
Burton N. Gates, Ph.D., . . . . . . . . . 42 Lincoln Avenue.
Apiarist.
Arthur I. Bourne, A.B., . . . . . . . . 12 East Pleasant Street.
Assistant Entomologist.

### Department of Plant and Animal Chemistry.

Joseph B. Lindsey, Ph.D., . . . . . . . . . 47 Lincoln Avenue.
Chemist.
Edward B. Holland, Ph.D., . . . . . . . 28 North Prospect Street.
Associate Chemist in charge of Research Division.
Fred W. Morse, M.Sc., . . . . . . . . . 40 Pleasant Street.
Research Chemist.
Henri D. Haskins, B.Sc., . . . . . . . . . . 14 Amity Street.
In charge of Fertilizer Division.
Philip H. Smith, M.Sc., . . . . . . . . . . 102 Main Street.
In charge of Feed and Dairy Division.
Lewell S. Walker, B.Sc., . . . . . . . . . 19 Phillips Street.
Assistant.
Rudolph W. Ruprecht,[1] Ph.D., . . . . . . . . 24 Pleasant Street.
Assistant.
Carleton P. Jones, M.Sc., . . . . . . . . . . Bank Block.
Assistant.
Carlos L. Beals, M.Sc., . . . . . . . . . 4 Kendrick Place.
Assistant.
James P. Buckley, B.Sc., . . . . . . . . . 29 Lincoln Avenue.
Assistant.
Windom A. Allen, B.Sc., . . . . . . . . . 24 Pleasant Street.
Assistant.
John B. Smith,[2] B.Sc., . . . . . . . . . . North Prospect Street.
Assistant.
Robert S. Scull,[3] B.Sc., . . . . . . . . . . Mount Pleasant.
Assistant.
James T. Howard, . . . . . . . . . . . 46 Pleasant Street.
Collector.
Harry L. Allen, . . . . . . . . . . . . 89 Main Street.
Assistant.
James R. Alcock, . . . . . . . . . . . . North Amherst.
Assistant.

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[1] Resigned Nov. 30, 1916.
[2] Services began Oct. 1, 1917.
[3] Services began Feb. 1, 1917.

### Department of Horticulture.

| | |
|---|---|
| Frank A. Waugh, M.Sc.,<br>Horticulturist. | Campus. |
| Fred C. Sears,[1] M.Sc.,<br>Pomologist. | Mount Pleasant. |
| Jacob K. Shaw, Ph.D.,<br>Research Pomologist. | 5 Farview Way. |

### Department of Meteorology.

| | |
|---|---|
| John E. Ostrander, A.M., C.E.,<br>Meteorologist. | 33 North Prospect Street. |

### Department of Microbiology.

| | |
|---|---|
| Charles E. Marshall, Ph.D.,<br>In charge of Department. | 44 Sunset Avenue. |
| F. H. Hesselink van Suchtelen, Ph.D.,<br>Associate Professor of Microbiology. | 30 North Prospect Street. |

### Department of Poultry Husbandry.

| | |
|---|---|
| John C. Graham, B.Sc.Agr.,<br>In charge of Department. | Lincoln Avenue. |
| Hubert D. Goodale, Ph.D.,<br>Research Biologist. | North Amherst. |

### Department of Veterinary Science.

| | |
|---|---|
| James B. Paige, B.Sc., D.V.S.,<br>Veterinarian. | 42 Lincoln Avenue. |
| George E. Gage, Ph.D.,<br>Associate Professor of Animal Pathology. | 27 Sunset Avenue. |
| John B. Lentz, A.B., V.M.D.,<br>Assistant in Veterinary Science. | 24 Pleasant Street. |
| Arnold P. Sturtevant,[2] A.B.,<br>Assistant in Veterinary Science. | 41 Lincoln Avenue. |

## THE EXTENSION SERVICE STAFF.

| | |
|---|---|
| William D. Hurd, M.Agr.,<br>Director of the Extension Service and Supervisor of Short Courses. | 46 Amity Street. |
| Earnest D. Waid, B.Sc.Agr.,<br>Assistant Director. | 61 Amity Street. |
| Sumner R. Parker, B.Sc.,<br>Extension Professor of Rural Organization and County Agent Leader. | 51 Amity Street. |
| Ezra L. Morgan, A.M.,<br>Extension Professor of Community Planning. | 2 Allen Street. |
| Laura Comstock,<br>Extension Professor of Home Economics. | 84 Pleasant Street. |
| E. Farnham Damon, B.Sc.,<br>Extension Associate Professor of Agricultural Economics. | Bank Block. |
| George L. Farley, M.Sc.,<br>Supervisor of Junior Extension Work. | 31 Lincoln Avenue. |
| Erwin H. Forbush,<br>Supervisor of Correspondence Courses. | 8 Nutting Avenue. |
| Ethel H. Nash,<br>Extension Instructor in Agricultural Education. | 16 Nutting Avenue. |
| Alfred G. Lunn, B.Sc.,<br>Extension Instructor in Poultry Husbandry. | North Amherst. |
| Eric N. Boland,[3] M.Sc.,<br>Extension Instructor in charge of Boys' and Girls' Pig Club Work. | Bank Block. |
| Marie Sayles, B.Sc.,<br>Extension Instructor in Home Economics. | 79 Pleasant Street. |

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[1] On leave, first term, 1916–17.

[2] Resigned, to take effect Nov. 30, 1916.

[3] Resigned, to take effect Dec. 2, 1916.

| | |
|---|---|
| Wesley H. Bronson, B.Sc.,<br>Extension Instructor in Farm Demonstration. | Lincoln Block. |
| William F. Turner, B.Sc.,<br>Extension Instructor in Animal Husbandry. | 37 Cottage Street. |
| Frank A. C. Smith, B.Sc.,<br>Extension Instructor in Civic Improvement. | 24 Pleasant Street. |
| Austin D. Kilham, B.Sc.Agr.,<br>Extension Instructor in Pomology. | 24 Pleasant Street. |
| Victor A. Rice,[1] B.Sc.,<br>Extension Instructor in charge of Pig Club Work. | 24 Pleasant Street. |
| Roswell W. Henninger,[2]<br>Extension Instructor in charge of Poultry Club Work. | 87 Pleasant Street. |

## THE CLERICAL STAFF.

| | |
|---|---|
| Elbert L. Arnold,<br>Chief Clerk, Extension Service. | North Amherst. |
| Eleanor Barker,<br>Clerk, Division of Horticulture. | 9 Phillips Street. |
| Eleanor F. Bishop,<br>Clerk, Treasurer's Office. | 3 Spaulding Street. |
| Evelyn Brewster, B.Sc.,<br>Clerk, President's Office. | 9 Phillips Street. |
| John K. Broadfoot,<br>Cashier, Treasurer's Office. | 7½ East Pleasant Street. |
| Maude Chambers,[3]<br>Inventory Clerk, Treasurer's Office. | 6 Allen Street. |
| Lena V. Chapman,<br>Library Assistant. | 77 South Pleasant Street. |
| Lucia G. Church,<br>First Clerk, Experiment Station. | North Amherst. |
| Doris Clark,[1]<br>Stenographer, Extension Service. | North Amherst. |
| Marcella P. Curry, B.Sc.,<br>Clerk, Department of Poultry Husbandry. | Draper Hall. |
| Lalia M. Damon,<br>Cataloguer, Library. | 10 Nutting Avenue. |
| Louise G. Davidson,<br>Telephone Operator, Stockbridge Hall. | 7 Northampton Road. |
| Llewelyn L. Derby,<br>Assistant, Department of Physical Education. | 81 Pleasant Street. |
| Hazel Dewar,<br>Stenographer, Division of Agriculture. | 6 Clifton Avenue. |
| Marion F. Dondale, A.B.,<br>Clerk, Graduate School and Department of Microbiology. | 101 Butterfield Road. |
| F. Ethel Felton, A.B.,<br>Clerk, Director's Office, Experiment Station. | 8 Allen Street. |
| Katherine L. Fenton,[4]<br>Stenographer, Department of Dairying. | Northampton. |
| Lina E. Fisher,<br>Clerk, Department of Chemistry. | 28 Pleasant Street. |
| Grace E. Gallond,<br>Clerk, Department of Dairying. | 28 Pleasant Street. |
| Margaret T. Gaskell,<br>Stenographer, offices of Dean and Registrar. | 105 Main Street. |
| Lillian M. Gelinas,<br>Clerk, President's Office. | 77 Pleasant Street. |
| Alice M. Gilbert,[5]<br>First Clerk, Division of Agriculture. | 9 Phillips Street. |
| Cora B. Grover,<br>Clerk, Director's Office, Extension Service. | North Amherst. |

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[1] Services began Dec. 4, 1916.
[2] Services began Jan. 1, 1917.
[3] Services began Nov. 1, 1916.
[4] Resigned Feb 13, 1917.
[5] Resigned Nov. 9, 1916.

Marion Guertin, . . . . . . . . . . . 20 Pleasant Street.
Clerk, Department of Beekeeping.

Lillian S. Hadfield, . . . . . . . . . . . 9 Phillips Street.
Clerk, Extension Service.

Laura W. Hager, A.B., . . . . . . . . . . South Deerfield.
Clerk, Department of Agricultural Economics.

Mary G. Hanifin,[1] . . . . . . . . . . . Northampton.
Clerk, Division of Agriculture.

Mary E. Horton, . . . . . . . . . . . 79 Pleasant Street.
Clerk, Department of Rural Sociology.

Alice M. Howard, . . . . . . . . . . . North Amherst.
First Clerk, Experiment Station.

Lorian P. Jefferson, A.M., . . . . . . . . . . 84 Pleasant Street.
Research Secretary, Division of Rural Social Science.

Helena Keiber, . . . . . . . . . . . 50 Pleasant Street.
Stenographer, Extension Service.

Clarence Kendall,[2] . . . . . . . . . . . . . Hadley.
Clerk, Extension Service.

Ethel L. Kennedy, . . . . . . . . . . . 9 Phillips Street.
Clerk, Extension Service.

Helen Martin,[3] . . . . . . . . . . . 19 South East Street.
Stenographer, Department of Entomology.

Irene A. Martin, . . . . . . . . . . . 19 South East Street.
Stenographer, Treasurer's Office.

Rebecca L. Mellor, . . . . . . . . . . . 10 Kellogg Avenue.
Clerk, Experiment Station.

Nell C. Milton, . . . . . . . . . . . . Draper Hall.
Stenographer, Division of Rural Social Science.

Elizabeth E. Mooney, . . . . . . . . . . Draper Hall.
Stenographer, Department of Poultry Husbandry.

Grace B. Nutting, Ph.B., . . . . . . . . . . North Amherst.
Curator, Department of Botany.

Bridie E. O'Donnell, . . . . . . . . . . . . Hadley.
Clerk, Department of Entomology.

Helen C. Pomeroy, . . . . . . . . . . . . Draper Hall.
Clerk, Department of Floriculture.

Frances Powers,[4] . . . . . . . . . . . . Lincoln Avenue.
Stenographer, Department of Dairying.

Vivian Roy, . . . . . . . . . . . . 5 McClellan Street.
Library Assistant.

Edna M. Sanders, . . . . . . . . . . . . . Hadley.
Bookkeeper, Treasurer's Office.

Mary I. Shores, . . . . . . . . . . . . Bank Block.
Clerk, Dean's Office.

Elsa Slattery,[5] . . . . . . . . . . . . Northampton.
Stenographer, Extension Service.

Ethelyn Streeter, . . . . . . . . . . . South Deerfield.
Stenographer, Division of Horticulture.

Flora E. Torrey, . . . . . . . . . . . North Mt. Pleasant.
Clerk, Extension Service.

Ethel M. Turner, . . . . . . . . . . . 55 Pleasant Street.
Library Assistant.

Olive M. Turner, B.Sc., . . . . . . . . . . 22 Spaulding Street.
Clerk, Registrar's Office.

Henrietta L. Webster, . . . . . . . . . . . Draper Hall.
First Clerk, Treasurer's Office.

Ellen L. Welch,[6] . . . . . . . . . . . 17 Fearing Street.
Stenographer, Department of Botany.

Aurelia B. Wentworth, . . . . . . . . . . . South Amherst.
First Clerk, Division of Agriculture.

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[1] Services began Nov. 13, 1916.

[2] Services began Jan. 15, 1917.

[3] Services began Oct. 14, 1916.

[4] Services began Feb. 1, 1917.

[5] Resigned, to take effect Dec. 9, 1916.

[6] Services began Jan. 2, 1917.

## STAFF OF OPERATING AND MAINTENANCE.

| | |
|---|---|
| John J. Barber,<br>Farm Superintendent. | Campus. |
| Thomas Butterworth,<br>Engineer. | 6 Phillips Street. |
| John L. Byard,<br>Superintendent of the Apiary. | 21 Pleasant Street. |
| Lawrence S. Dickinson, B.Sc.,<br>Superintendent of Grounds. | 2 Farview Way. |
| Clarence A. Jewett,<br>Superintendent of Buildings. | 112 Pleasant Street. |
| Ora L. Kennedy,<br>Manager of the Dining Hall. | Draper Hall. |
| John J. Lee,<br>Assistant to the Military Detail. | 38 Cottage Street. |
| Florence Levensaler,<br>Resident Nurse. | Infirmary. |
| George F. Pushee,<br>Shop Assistant, Rural Engineering. | 21 Maple Ave., Northampton. |
| Alexander Smart,<br>Assistant to the Commandant. | 39 East Pleasant Street. |
| Newton Wallace,[1]<br>Electrician. | Campus. |
| James Whiting,<br>Foreman, Department of Floriculture. | 16 Hallock Street. |

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[1] Retired Jan. 31, 1917.

# STANDING COMMITTEES OF THE FACULTY.

## 1916-17.

### CATALOGUE AND OTHER PUBLICATIONS.

Associate Professor NEAL.
  Professor LOCKWOOD.
  Secretary WATTS.

### COMMENCEMENT.

Dean LEWIS.
  Treasurer KENNEY.
  Captain FLEET.
  Professor PETERS.
  Associate Professor NEHRLING.
  Secretary WATTS.
  Assistant Professor ROBBINS.

### COURSE OF STUDY.

President BUTTERFIELD.
  Dean LEWIS.
  Professor HART.
  Professor WAUGH.
  Professor FOORD.
  Professor SPRAGUE.
  Professor FERNALD.
  Professor OSTRANDER.
  Professor MARSHALL.
  Professor CHAMBERLAIN.
  Professor CANCE.
  Associate Professor CHENOWETH.

### DISCIPLINE (ADVISORY).

Dean LEWIS.
  Registrar HASBROUCK.
  Professor HICKS.
  Professor PHELAN.
  Associate Professor MACKIMMIE.

### EMPLOYMENT.

Professor SEARS.
  Dean LEWIS.
  Treasurer KENNEY.
  Professor LOCKWOOD.
  Professor MCNUTT.
  Secretary WATTS.

### ENTRANCE EXAMINATIONS AND ADMISSION.

- Registrar Hasbrouck.
  - Dean Lewis.
  - Professor Osmun.
  - Professor Ernest Anderson.
  - Associate Professor Ashley.
  - Assistant Professor Duncan.
  - Mr. Rand.

### HEALTH AND SANITATION.

- Professor Marshall.
  - Treasurer Kenney.
  - Captain Fleet.
  - Professor Hicks.
  - Miss Comstock.

### LIBRARY.

- Professor Marshall.
  - Professor Sprague.
  - Professor Gunness.
  - Assistant Professor A. S. Thomson.
  - Mr. Green.

### SCHEDULE.

- Professor Lockwood.
  - Professor Peters.
  - Assistant Professor Duncan.

### SCHOLARSHIP.

- Dean Lewis.
  - Registrar Hasbrouck.
  - Professor Chamberlain.
  - Professor Ernest Anderson.
  - Associate Professor Mackimmie.
  - Assistant Professor Robbins.
  - Assistant Professor Machmer.
  - Mr. Rand.

### STUDENT LIFE.

- President Butterfield.
  - Dean Lewis.
  - Treasurer Kenney.
  - Director Hurd.
  - Professor Chamberlain.
  - Professor Sprague.
  - Professor Hart.
  - Professor Crampton.
  - Professor Phelan.
  - Professor Lockwood.
  - Professor Ernest Anderson.
  - Professor Hicks.
  - Associate Professor Mackimmie.
  - Secretary Watts.
  - Associate Professor Paul J. Anderson.
  - Assistant Professor Harrison.
  - Assistant Professor Quaife.
  - Assistant Professor Machmer.
  - Assistant Professor A. S. Thomson.
  - Assistant Professor Robbins.

### UNCLASSIFIED STUDENTS.

Dean LEWIS.
    Professor WAUGH.
    Professor FOORD.
    Registrar HASBROUCK.
    Assistant Professor MACHMER.

### APPOINTED TO ATHLETIC BOARD.

Dean LEWIS.
    Registrar HASBROUCK.
    Professor OSMUN.

### APPOINTED TO NON-ATHLETIC BOARD.

Professor LOCKWOOD.
    Assistant Professor MACHMER.

# THE COLLEGE.

# ADMISSION.

## A. APPLICATION FOR ADMISSION.

All correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

## B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

CERTIFICATES. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present at least three of the necessary fourteen credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

| | |
|---|---|
| **In June,** | Amherst, Department of Physics building.<br>Massachusetts Institute of Technology, Cambridge, Mass.<br>Worcester, Horticultural Hall. |
| **In September,** | Amherst, Department of Physics building. |

**Please note that September examinations are held in Amherst only.**

*Schedule for Entrance Examinations, June 28-30, inclusive, 1917.* — The examinations in June will follow this schedule: —

*First Day.*

| | |
|---|---|
| 7.45 A.M. | Registration.[1] |
| 8.00 A.M. | Plane geometry. |
| 10.00 A.M. | Chemistry. |
| 11.30 A.M. | Botany. |
| 2.00 P.M. | Solid geometry. |
| 4.00 P.M. | Physics. |

*Second Day.*

| | |
|---|---|
| 8.00 A.M. | Required English. |
| 11.00 A.M. | Algebra. |
| 2.00 P.M. | History, required and elective. |

*Third Day.*

| | |
|---|---|
| 8.00 A.M. | French, German, required and elective. |
| 1.00 P.M. | Latin A and B and all one-half credit electives, except those already noted. |

*Schedule for Entrance Examinations in September.* — In September, 1917, the examinations will be given September 12–15, inclusive, and will follow the order indicated below: —

*First Day.*

| | |
|---|---|
| 1.00 P.M. | Registration. |
| 1.15–5.00 P.M. | Greek A and B. |

*Second Day.*

| | |
|---|---|
| 8.00 A.M. | Plane geometry. |
| 10.00 A.M. | Chemistry. |
| 11.30 A.M. | Botany. |
| 2.00 P.M. | Solid geometry. |
| 4.00 P.M. | Physics. |

*Third Day.*

| | |
|---|---|
| 8.00 A.M. | Required English. |
| 11.00 A.M. | Algebra, agriculture. |
| 2.00 P.M. | History, required and elective. |

*Fourth Day.*

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|---|---|
| 8.00 A.M. | French, German, required and elective. |
| 1.00 P.M. | Latin A and B and all one-half credit electives, except those already noted. |

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[1] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

### C. Requirements for Admission.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year. **Neither more nor less credit will be given in any subject than is indicated in the table below.** Fourteen units must be offered for admission. In the list given below, *every subject in black-faced type is prescribed and no substitution is allowed.* The subjects so typed total eight and one-half units. In addition to these points five and one-half more units must be chosen from the subjects printed in light-faced type. Not more than four half-credit units may be offered. No applicant deficient in both algebra and plane geometry will be admitted.

| | |
|---|---|
| Agriculture[1] (see also note at end of volume), | ½ or 1 |
| Botany,[2] | ½ or 1 |
| Chemistry,[2] | 1 |
| **Algebra,** | 1½ |
| **Plane geometry,** | 1 |
| Solid geometry, | ½ |
| Trigonometry, | ½ |
| Physics,[2] | 1 |
| Geology, | ½ |
| Physiography, | ½ |
| Physiology, | ½ |
| Zoölogy,[2] | ½ |
| **History**[3] (Ancient; Medieval and Modern; English; General; United States and Civics), *any one,* | 1[4] |
| **English 1,** | 1½ |
| **English 2,** | 1½ |
| **Modern Language** (elementary French or elementary German), | 2 |
| Elementary French,[5] | 2 |
| Elementary German,[5] | 2 |
| Intermediate French, | 1 |
| Advanced French, | 1 |
| Intermediate German, | 1 |
| Advanced German, | 1 |
| Greek A,[1] | 2 |
| Greek B,[1] | 1 |
| Latin A, | 2 |
| Latin B, | 1 |
| Commercial geography,[6] | ½ |
| Drawing,[6] | ½ |
| Manual training,[6] | ½ or 1 |

**PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, below).**

**Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books; but their certificates must state that note-books have been satisfactorily completed.**

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[1] Examination in September only.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] One must be offered for the required point; one, two or three others may be offered for elective points.

[4] For each offered.

[5] May be offered as elective if not offered to satisfy *prescribed* points.

[6] On certificate only, no examination given.

### D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information: but it will call for not less than one-half year of creditable work of high school grade. **The examination in agriculture will be given in September only.**

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Steven's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements. The keeping of a note-book is required.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Text-book of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

HISTORY. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

English. — For 1916–19 inclusive: —

The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature* (One and One-half Units). — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

*A. Reading.* — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I.: —

*Group I. Classics in Translation:* The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of Books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of Books XI., XIII., XIV., XV., XVIII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any one selection from Group I. a selection from any other group may be substituted.

*Group II. Shakspere:* "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"[1] "Macbeth;"[1] "Hamlet."[1]

*Group III. Prose Fiction:* Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voyages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one;* Jane Austen's novels, any *one;* Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens' novels, any *one;* Thackeray's novels, any *one;* George Eliot's novels, any *one;* Mrs. Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reade's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevenson's "Treasure Island" or "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one;* Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables" or "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

*Group IV. Essays, Biography, etc.:* Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tatler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" selections from Irving's "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" selections from Lamb's "Essays of Elia" (about 100 pages); selections from Lockhart's "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison and Steele in the English Humorists;" Macauley: any one of the following essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay:" selections from Trevelyan's "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years Before the Mast;" Lincoln's "Selections," including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address, the letter to Horace Greeley, together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson and later writers; a collection of "Letters" by various standard writers.

*Group V. Poetry:* Palgrave's "Golden Treasury" (first series), Books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury" (first series), Book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens" and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake" or "Marmion;"

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[1] If not chosen for study under B.

Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The Armada," "Ivry;" Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Herve Riel," "Pheidippides," "My Lost Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum"and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

*B. Study.* — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

*Group I. Drama:* Shakspere's "Julius Cæsar," "Macbeth," "Hamlet."

*Group II. Poetry:* Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

*Group III. Oratory:* Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

*Group IV. Essays:* Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

*Examination.* — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading.

The examination in literature will include: —

(*a*) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above.

(*b*) A test on the books prescribed for study, which will consist of questions upon their content and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

French. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

German. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

Greek. — Greek will receive credit as an elective requirement upon either examination or certification, as follows. (**The examination in Greek A and Greek B will be given in September only.**)

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

Latin. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either Books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," Books I. to IV.

COMMERCIAL GEOGRAPHY.[1] — Preparation should be made in a course equivalent to that laid down in Adams' "Commercial Geography," Trotter's "Geography of Commerce," or a similar work. (No examination given.)

DRAWING.[1] — The applicant may offer either freehand or mechanical drawing or both. He must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable him to draw correctly a simple geometric model from memory; or, if he present mechanical drawing, he must have working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented, see "Manual Training." (No examination given.)

MANUAL TRAINING.[1] — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

### E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

### F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

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[1] On certificate only; no examination given.

3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. Not more than five and one-half credits from the elective group will be accepted. No candidate deficient in both algebra and plane geometry will be admitted.

4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination during the first week of the second term. (2) Second entrance condition examination before the beginning of the period of final examinations of the second term, upon the payment of a fee of $5 to the treasurer.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

### G. UNCLASSIFIED STUDENTS.

**All requests for information concerning admission of unclassified students should be addressed to Dean Edward M. Lewis, chairman of committee on unclassified students.**

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-year high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

9. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

10. No unclassified student shall be allowed to participate in any intercollegiate contests.

### H. ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY.

*Purpose.* — This course is designed for graduates of the agricultural vocational schools and others who wish to prepare themselves for practical poultry keeping and can spend only one year at college.

*Scope.* — The work covers seven detailed courses in poultry husbandry, as well as short-course work in fruit growing, market gardening, bee culture, animal husbandry or other subjects that will be helpful to poultry raisers. In addition to classroom and laboratory exercises each student is required to put in from 25 to 30 hours per week at the plant in the care and management of poultry for the purpose of becoming proficient in the various branches of the work.

*Entrance Requirements.* — Applicants must be at least eighteen years of age and have a good elementary education.

*Fees.* — There is no tuition for residents of Massachusetts, but a laboratory fee of $5 is required for both the fall and spring terms.

NOTE. — The course is limited to 16 students.

# COURSES OF INSTRUCTION.

## TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

### FRESHMAN YEAR.

#### FIRST TERM.

*All work required.*

| SUBJECT. | Courses and Numbers. | Credit Hours per Week. |
|---|---|---|
| Chemistry, | Chemistry 1 or 4, | 3 |
| Algebra, | Mathematics 1, | 5 |
| Language, | French or German 1 or 4, | 3 |
| English, | English 1, | 3 |
| Agriculture and horticulture, | Agronomy 1, Animal Husbandry 1, Pomology 1, Poultry 1. | 2 |
| Tactics, | Military 1, | 1 |
| Drill, | Military 4, | 1 |
| Hygiene, | Physical Education 1, | 1 |
| Public speaking, | Public Speaking 1 (one-third of the class), | 1 |
| | | 20 |

College life (attendance without credit).

#### SECOND TERM.

| SUBJECT. | Courses and Numbers. | Credit Hours per Week. |
|---|---|---|
| Chemistry, | Chemistry 2 or 5, | 3 |
| Algebra, | Mathematics 2, | 2 |
| Trigonometry, | Mathematics 5, | 3 |
| Language, | French or German 2 or 5, | 3 |
| English, | English 2, | 3 |
| Agriculture and horticulture, | Agronomy 1, Animal Husbandry 1, Pomology 1, Poultry 1. | 2 |
| Gymnastics, | Physical Education 5, | 1 |
| Geology, | Geology 2, | 2 |
| Public speaking, | Public Speaking 1 (one-third of class), | 1 |
| | | 20 |

College life (attendance without credit).

## FRESHMAN YEAR — *Concluded.*

### THIRD TERM.

| SUBJECT. | Courses and Numbers. | Credit Hours per Week. |
|---|---|---|
| Chemistry, | Chemistry 3 or 6, | 3 |
| Solid geometry, | Mathematics 3, | 3 |
| Mensuration, | Mathematics 6, | 2 |
| Language, | French or German 3 or 6, | 3 |
| English, | English 3, | 3 |
| Botany, | Botany 3, | 3 |
| Tactics, | Military 3, | 1 |
| Drill, | Military 6, | 1 |
| Public speaking, | Public Speaking 1 (one-third of class), | 1 |
| | | 20 |

College life (attendance without credit).

## SOPHOMORE YEAR.

### FIRST TERM.

| SUBJECT. | Course Number. | Class Hours. | Two Hour Laboratory Periods. | Credit Hours per Week. |
|---|---|---|---|---|
| *Required.* | | | | |
| Physics, | 25 | 3 | 1 | 4 |
| Zoölogy, | 25 | 1 | 2 | 3 |
| Botany, | 25 | 1 | 2 | 3 |
| English, | 25 | 2 | – | 2 |
| Military, | 25 | 1 | – | 1 |
| Military, | 28 | – | 1 | 1 |
| Total required, | – | – | – | 14 |
| *Elective.* | | | | |
| Chemistry, | 25 | 1 | 2 | 3 |
| French, | 25 or 28 | 3 | – | 3 |
| German, | 25 or 28 | 3 | – | 3 |
| Drawing, | 25 | – | 3 | 3 |
| Animal husbandry, | 25 | 2 | 1 | 3 |
| Rural engineering, | 25 | – | 2 | 2 |

## SOPHOMORE YEAR — *Concluded.*

### SECOND TERM.

| SUBJECT. | Course Number. | Class Hours. | Two Hour Laboratory Periods. | Credit Hours per Week. |
|---|---|---|---|---|
| *Required.* | | | | |
| Physics, | 26 | 2 | 1 | 3 |
| Agricultural economics, | 26 | 5 | - | 5 |
| English, | 26 | 2 | - | 2 |
| Physical education, | 26 | - | 1 | 1 |
| | - | - | - | 11 |
| *Elective.* | | | | |
| Chemistry, | 26 | 1 | 2 | 3 |
| French, | 26 or 29 | 3 | - | 3 |
| German, | 26 or 29 | 3 | - | 3 |
| Mathematics, | 26 | 2 | - | 2 |
| Drawing, | 26 | - | 3 | 3 |
| Entomology, | 26 | 3 | - | 3 |
| Animal husbandry, | 26 | 1 | 2 | 3 |
| Rural engineering, | 26 | - | 2 | 2 |
| Botany, | 26 | 1 | 2 | 3 |
| Economic sociology, | 26 | 5 | - | 5 |

### THIRD TERM.

| SUBJECT. | Course Number. | Class Hours. | Two Hour Laboratory Periods. | Credit Hours per Week. |
|---|---|---|---|---|
| *Required.* | | | | |
| Rural sociology, | 27 | 3 | - | 3 |
| Agronomy, | 27 | 4 | 1 | 5 |
| English, | 27 | 2 | - | 2 |
| Military, | 27 | 1 | - | 1 |
| Military, | 30 | - | 1 | 1 |
| Total required, | - | - | - | 12 |
| *Elective.* | | | | |
| Chemistry, | 27 | 1 | 4 | 5 |
| Chemistry, | 30 | 3 | 2 | 5 |
| French, | 27 or 30 | 3 | - | 3 |
| German, | 27 or 30 | 3 | - | 3 |
| Mathematics, | 27 | - | 3 | 3 |
| Drawing, | 27 | - | 3 | 3 |
| Entomology, | 27 | - | 2 | 2 |
| Geology, | 27 | 3 | 2 | 5 |
| Physics, | 27 | 4 | 1 | 5 |
| Horticulture, | 27 | 2 | 1 | 3 |
| Zoölogy, | 27 | 1 | 2 | 3 |

## MAJORS: JUNIOR AND SENIOR YEARS.

### General Statement.

A major consists of 45 credit hours of correlated work, to be arranged by the student and an instructor called the adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

### Rules governing Majors.

Rule 1. *Election.* — Each student, before the first term of his junior year, shall elect a major subject from the list of majors given below; and this major shall consist of 45 credit hours of correlated work.

Rule 2. *Minimum Credits.* — The minimum number of credits for graduation shall be 234 credit hours, inclusive of military drill and physical education.

Rule 3. *Maximum Credits.* — The maximum number of credits for any term of the junior or senior year shall be 22; the minimum shall be 19.

Rule 4. *Humanities and Rural Social Science.* — A minimum of 18 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 5 credit hours will be required in each of the divisions, except that the minimum for the class of 1918 shall be 22 hours.

Rule 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 45 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

Rule 6. *Free Electives.* — Each student during his junior and senior years is required to take 45 hours in his major and also 18 hours in the Divisions of the Humanities and Rural Social Science, making a total of 63 hours (but see Rule 4). He is allowed free choice of courses to complete his required hours.

Rule 7. *Registration.* — No junior or senior shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office three weeks before the close of each term.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the succeeding term and countersign the card.

(3) Each course card must be filled out, giving the name of student, his college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours

of free elections added by the student, the card must be returned to the registrar one week before the beginning of the final examination period.

Rule 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by the committee on scholarship, they become operative at the beginning of the term following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

## AGRICULTURE. (Major.)

Professor JAMES A. FOORD, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. |
|---|---|---|
| Agronomy, | 50 **I.** | 5 |
| Agronomy, | 76 **III.** | 5 |
| Animal Husbandry, | 51 **III.** | 3 |
| Animal Husbandry, | 75 **I.** | 3 |
| Animal Husbandry, | 76 **II.** | 3 |
| Dairying, | 50 **I.** | 5 |
| Farm Management, | 75 **II.** | 3 |
| Farm Management, | 76 **III.** | 5 |
| Microbiology, | 50 **I.** | |
| or | | 5 |
| Microbiology, | 50 **III.** | |
| Rural Engineering, | 75 **I.** | 5 |
| | | 42 |

| Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|
| I. | Animal Husbandry 25, | 3 | Agronomy 50, | 5 | Animal Husbandry 75, | 3 |
| | Rural Engineering 25, | 2 | Dairying 50, | 5 | Rural Engineering 75, | 5 |
| II. | Mathematics 26, | 2 | | | Farm Management 75, | 3 |
| | Animal Husbandry 26, | 3 | | | Animal Husbandry 76, | 3 |
| | Rural Engineering 26, | 2 | | | | |
| III. | Chemistry 30, | 5 | Microbiology 50, | 5 | Agronomy 76, | 5 |
| | Mathematics 27, | 3 | Animal Husbandry 51, | 3 | Farm Management 76, | 5 |
| | Horticulture 27, | 3 | | | | |
| IV. | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Rural Engineering (shop work) 25 and 26, Chemistry 30, Mathematics 26 and 27, and Horticulture 27.

ADDITIONAL INFORMATION. — Dairying 75, Pomology 50 and 51, Rural Engineering 78, and Veterinary 51 and 78 are suggested as additional courses for the student fitting himself for general agriculture.

## AGRONOMY. (Major.)

Assistant Professor EARL JONES, *Acting Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Agronomy, | 50 **I.** | 5 | **I.** | Chemistry 25, | 3 | Agronomy 50, | 5 | Agronomy 75, | 5 |
| Agronomy, | 51 **III.** | 5 | | German 25 or 28, | 3 | Chemistry 51, | 8 | Animal Husbandry 75, | 5 |
| Agronomy, | 75 **I.** | 5 | | | | | | | |
| Agronomy, | 77 **II.** | 5 | **II.** | Botany 26, | 3 | Chemistry 52, | 8 | Agronomy 77, | 5 |
| Animal Husbandry, | 75 **I.** | 3 | | Chemistry 26, | 3 | | | | |
| Chemistry, | 51 **I.** | 8 | | German 26 or 29, | 3 | | | | |
| | | | | Mathematics 26, | 2 | | | | |
| Chemistry, | 52 **II.** | 8 | **III.** | German 27 or 30, | 3 | Agronomy 51, | 5 | Farm Management 76, | 5 |
| Farm Management, | 76 **III.** | 5 | | Mathematics 27, | 3 | | | | |
| | | | | Geology 27, | 5 | | | | |
| | | 44 | | | | | | | |
| | | | **IV.** | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Chemistry 25 and 26, German 25 or 28, 26 or 29, 27 or 30, Geology 27, Botany 26.
ADVISED. — Mathematics 26 and 27.

## ANIMAL HUSBANDRY. (Major.)

Professor JOHN C. MCNUTT, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Agronomy, | 50 **I.** | 5 | **I.** | Animal Husbandry 25, | 3 | Agronomy 50, | 5 | Animal Husbandry 75, | 3 |
| Animal Husbandry, | 51 **III.** | 3 | | | | Veterinary 50, | 5 | | |
| Animal Husbandry, | 50 **II.** | 1 | | | | Dairying 50, | 5 | | |
| Animal Husbandry, | 52 **III.** | 3 | **II.** | Animal Husbandry 26, | 3 | Animal Husbandry 50, | 1 | Animal Husbandry 76, | 3 |
| Animal Husbandry, | 75 **I.** | 3 | | | | | | Animal Husbandry 78, | 3 |
| Animal Husbandry, | 76 **II.** | 3 | | | | | | Farm Management 75, | 3 |
| Animal Husbandry, | 77 **III.** | 3 | **III.** | Chemistry 30, | 5 | Animal Husbandry 51, | 3 | Animal Husbandry 80, | 1 |
| Animal Husbandry, | 78 **II.** | 3 | | | | Animal Husbandry 52, | 3 | Animal Husbandry 77, | 3 |
| Animal Husbandry, | 80 **III.** | 1 | | | | | | Farm Management 76, | 5 |
| Dairying, | 50 **I.** | 5 | **IV.** | | | | | | |
| Farm Management, | 75 **II.** | 3 | | | | | | | |
| Farm Management, | 76 **III.** | 5 | | | | | | | |
| Veterinary, | 50 **I.** | 5 | | | | | | | |
| | | 43 | | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Chemistry 30.

ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left to the student to choose.

### DAIRYING. (Major.)

Professor WILLIAM P. B. LOCKWOOD, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Animal Husbandry, | 52 **III.** | 3 | **I.** | Animal Husbandry 25, | 3 | Dairying 50, | 5 | Animal Husbandry 75, | 3 |
| Animal Husbandry, | 75 **I.** | 3 | | Rural Engineering 25, | 2 | Microbiology 50, | 5 | Microbiology 82, | 5 |
| Animal Husbandry, | 76 **II.** | 3 | | | | | | | |
| Dairying, | 50 **I.** | 5 | **II.** | Animal Husbandry 26, | 3 | Rural Engineering 77, | 5 | Farm Management 75, | 3 |
| Dairying, | 51 **III.** | 5 | | Rural Engineering 26, | 2 | Microbiology 51, | 5 | Animal Husbandry 76, | 3 |
| Dairying, | 75 **II.** | 5 | | | | (Prerequisite to 82.) | | Dairying 75, | 5 |
| Dairying, | 76 **III.** | 5 | **III.** | Chemistry 30, | 5 | Animal Husbandry 52, | 3 | Dairying 76, | 5 |
| Farm Management, | 75 **II.** | 3 | | | | Dairying 51, | 5 | | |
| Microbiology, | 50 **I.** | 5 | | | | | | | |
| Microbiology, | 82 **I.** | 5 | | | | | | | |
| Rural Engineering, | 77 **II.** | 5 | **IV.** | | | | | | |
| | | 47 | | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Rural Engineering 25 and 26, Chemistry 30.

ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left to the student to choose.

## POULTRY HUSBANDRY. (Major.)

Professor JOHN C. GRAHAM, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Agricultural Economics, | 75 **I.** | 5 | **I.** | | | Poultry 50, | 3 | Poultry 76, | 5 |
| Animal Husbandry, | 51 **III.** | 3 | | | | Poultry 51, | 2 | Poultry 77, | 5 |
| Poultry Husbandry, | 50 **I.** | 3 | | | | Agricultural Economics 75, | 5 | Pomology 50, | 3 |
| Poultry Husbandry, | 51 **I.** | 2 | **II.** | | | Poultry 52, | 3 | Poultry 75, | 5 |
| Poultry Husbandry, | 52 **II.** | 3 | | | | | | Veterinary 86, | 3 |
| Poultry Husbandry, | 53 **III.** | 5 | | | | | | | |
| Poultry Husbandry, | 54 **III.** | 2 | **III.** | | | Poultry 53, | 5 | | |
| Poultry Husbandry, | 75 **II.** | 5 | | | | Poultry 54, | 2 | | |
| Poultry Husbandry, | 76 **I.** | 5 | | | | Animal Husbandry 51, | 5 | | |
| Poultry Husbandry, | 77 **I.** | 5 | **IV.** | | | | | | |
| Pomology, | 50 **I.** | 3 | | | | | | | |
| Veterinary Science, | 86 **II.** | 3 | | | | | | | |
| | | 44 | | | | | | | |

SOPHOMORE RECOMMENDATIONS. — Students intending to major in Poultry Husbandry are urged to take Zoölogy 27.

ADVISED. — Juniors who did not take Zoölogy 27 as sophomores are strongly advised to include it in their program.

## FLORICULTURE.

Associate Professor ARNO H. NEHRLING, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Botany, | 50 **I.** | 2 | **I.** | Drawing 25, | 3 | Floriculture 50, | 4 | Floriculture 75, | 3 |
| Botany, | 51 **II.** | 2 | | | | Floriculture 53, | 3 | Horticulture 50, | 5 |
| Entomology, | 26 **II.** | 3 | | | | Botany 50, | 2 | | |
| Floriculture, | 50 **I.** | 4 | **II.** | Drawing 26, | 3 | Floriculture 51, | 4 | Floriculture 77, | 3 |
| Floriculture, | 51 **II.** | 4 | | Entomology 26, | 3 | Floriculture 54, | 3 | Floriculture 76, | 3 |
| Floriculture, | 52 **III.** | 4 | | Botany 26, | 3 | Entomology 26, | 5 | | |
| | | | | | | Botany 51, | 2 | | |
| Floriculture, | 53 **I.** | 3 | **III.** | Drawing 27, | 3 | Floriculture 52, | 4 | Floriculture 80, | 3 |
| Floriculture, | 54 **II.** | 3 | | Entomology 27, | 2 | Floriculture 78, | 3 | Horticulture 51, | 5 |
| Floriculture, | 75 **I.** | 3 | | Horticulture 27, | 3 | | | | |
| Floriculture, | 76 **II.** | 3 | | | | | | | |
| Floriculture, | 77 **II.** | 3 | **IV.** | | | | | | |
| Floriculture, | 78 **III.** | 3 | | | | | | | |
| Floriculture, | 80 **III.** | 3 | | | | | | | |
| Horticulture, | 50 **I.** | 5 | | | | | | | |
| Horticulture, | 51 **III.** | 5 | | | | | | | |
| | | 50 | | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES. — Drawing 25, 26 and 27, Entomology 26 and 27, Botany 26 and Horticulture 27.

ADDITIONAL INFORMATION. — The rest of the sophomore electives allowed are left to the student to choose. Horticulture 50 and 51 will be taken by seniors.

ADVISED. — The department advises all students who major in this subject to take Botany 78 and Landscape Gardening 75.

## FORESTRY. (Major.)

Professor WILLIAM D. CLARK, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Botany, | 50 **I.** | 2 | **I.** | Drawing 25, | 3 | Forestry 50, | 3 | Forestry 75, | 5 |
| Botany, | 50 **II.** | 2 | | Rural Engineering 25, | 2 | Landscape Gardening 50, | 5 | | |
| Entomology, | 75 **III.** | 4 | | | | Horticulture 50, | 5 | | |
| | | | | | | Botany 50, | 2 | | |
| Forestry, | 50 **I.** | 3 | **II.** | Drawing 26, | 3 | Forestry 51, | 3 | | |
| Forestry, | 51 **II.** | 3 | | Mathematics 26, | 2 | Botany 51, | 2 | | |
| Forestry, | 53 **III.** | 3 | | Entomology 26, | 3 | Landscape Gardening 51, | 4 | | |
| Forestry, | 54 **IV.** | 5 | | Botany 26, | 3 | | | | |
| Forestry, | 75 **I.** | 5 | **III.** | Drawing 27, | 3 | Forestry 53, | 3 | Forestry 78, | 3 |
| Forestry, | 78 **III.** | 3 | | Mathematics 27, | 2 | Horticulture 51, | 5 | | |
| Horticulture, | 50 **I.** | 5 | | Entomology 27, | 3 | Entomology 75, | 4 | | |
| | | | | Horticulture 27, | 3 | | | | |
| Horticulture, | 51 **III.** | 5 | **IV.** | | | Landscape Gardening 53, | 5 | | |
| Landscape Gardening, | 50 **I.** | 5 | | | | Forestry 54, | 5 | | |
| Landscape Gardening, | 51 **II.** | 4 | | | | | | | |
| | | 49 | | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Drawing 25, 26 and 27, Rural Engineering 25, Mathematics 26 and 27, Entomology 26 and 27, Botany 26, Horticulture 27.

ADDITIONAL INFORMATION. — Substitutions according to individual needs may be made in conference with the adviser.

## LANDSCAPE GARDENING. (Major.)

Professor FRANK A. WAUGH, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Horticulture, | 50 **I.** | 5 | **I.** | Drawing 25, | 3 | Landscape Gardening 50, | 5 | Landscape Gardening 75, | 3 |
| Horticulture, | 51 **III.** | 5 | | | | Horticulture 50, | 5 | | |
| Landscape Gardening, | 50 **I.** | 5 | | | | Drawing 25, | 3 | | |
| Landscape Gardening, | 51 **II.** | 4 | **II.** | Drawing 26, | 3 | Landscape Gardening 51, | 4 | Landscape Gardening 76, | |
| Landscape Gardening, | 52 **III.** | 5 | | Mathematics 26, | 2 | Drawing 26, | 3 | | |
| Landscape Gardening, | 53 **IV.** | 5 | | Entomology 26, | 3 | | | | |
| Landscape Gardening, | 75 **I.** | 3 | **III.** | Drawing 27, | 3 | Landscape Gardening 52, | 5 | Landscape Gardening 78 or 79, | 3 |
| Landscape Gardening, | 76 **II.** | 4 | | Mathematics 27, | 3 | Horticulture 51, | 5 | Landscape Gardening 77, | 4 |
| Landscape Gardening, | 77 **III.** | 4 | | Horticulture 27, | 3 | Drawing 27, | 3 | | |
| | | | | | | Landscape Gardening 78 or 79, | 3 | | |
| Landscape Gardening, | 78 **III.** | 3 | **IV.** | | | Landscape Gardening 53, | 5 | | |
| or | | | | | | | | | |
| Landscape Gardening, | 79 **III.** | 3 | | | | | | | |
| | | 46 | | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Drawing 25, 26 and 27, Mathematics 26 and 27, Horticulture 27.

ADDITIONAL INFORMATION. — Modifications may be permitted when they appear advisable.

## Pomology. (Major.)

Professor Fred C. Sears, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

| Course. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Agronomy, | 77 **II.** | 5 | **I.** | Rural Engineering 25, | 2 | Pomology 50, | 3 | Pomology 75, | 3 |
| Rural Engineering, | 76 **I.** | 5 | | | | Rural Engineering 76, | 5 | Pomology 77, | 5 |
| | | | | | | | | Agronomy 75, | 5 |
| Entomology, | 26 **II.** | 3 | **II.** | Botany 26, | 3 | Pomology 51, | 3 | Pomology 76, | 3 |
| Entomology, | 27 **III.** | 2 | | Rural Engineering 26, | 2 | Entomology 26, | 5 | Agronomy 77, | 5 |
| Pomology, | 50 **I.** | 3 | | Entomology 26, | 3 | | | | |
| Pomology, | 51 **II.** | 3 | **III.** | Horticulture 27, | 3 | Pomology 52, | 3 | Pomology 78, | 3 |
| Pomology, | 52 **III.** | 3 | | Entomology 27, | 2 | Entomology 27, | 3 | | |
| Pomology, | 75 **I.** | 3 | | | | | | | |
| Pomology, | 76 **II.** | 3 | **IV.** | | | Pomology 53, | 5 | | |
| Pomology, | 77 **I.** | 5 | | | | | | | |
| Pomology, | 78 **III.** | 3 | | | | | | | |
| | | 38 | | | | | | | |

Sophomore Elective Prerequisites (Required). — Horticulture 27, Entomology 26 and 27.

Advised. — Rural Engineering 25 and 26, Botany 50.

Additional Information. — The rest of the sophomore electives allowed are left to the student to choose.

## ECONOMIC BOTANY. (Major.)

Professor A. VINCENT OSMUN, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Botany, | 52 **I.** | 3 | **I.** | Chemistry 25, | 3 | Botany 52, | 3 | Botany 75, | 5 |
| Botany, | 53 **II.** | 3 | | German 25 or 28, | 3 | Botany 55, | 3 | Botany 78, | 5 |
| Botany, | 54 **III.** | 3 | | | | Chemistry 51, | 8 | Botany 86, | 1 |
| Botany, | 55 **I.** | 3 | | | | | | | |
| Botany, | 56 **II.** | 3 | | | | | | | |
| Botany, | 75 **I.** | 5 | **II.** | Chemistry 26, | 3 | Botany 53, | 3 | Botany 76, | 5 |
| Botany, | 76 **II.** | 5 | | German 26 or 29, | 3 | Botany 56, | 3 | Botany 79, | 5 |
| Botany, | 77 **III.** | 5 | | Botany 26, | 3 | | | Botany 82, | 3 |
| Botany, | 78 **I.** | 5 | | | | | | Botany 87, | 1 |
| Botany, | 79 **II.** | 5 | | | | | | | |
| Botany, | 80 **III.** | 5 | | | | | | | |
| Botany, | 82 **II.** | 3 | **III.** | German 27 or 30, | 3 | Botany 54, | 3 | Botany 77, | 5 |
| Botany, | 83 **III.** | 3 | | | | | | Botany 80, | 5 |
| Botany, | 86 **I.** | 1 | | | | | | Botany 83, | 3 |
| Botany, | 87 **II.** | 1 | | | | | | Botany 88, | 1 |
| Botany, | 88 **III.** | 1 | | | | | | | |
| Chemistry, | 51 **I.** | 8 | | | | | | | |
| | | 62 | | | | | | | |
| | | | **IV.** | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). —German 25 or 28, 26 or 29, 27 or 30, Botany 26.

ADVISED. — Chemistry 25 and 26.

ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left to the student to choose. Selection of 45 credits of the above (Pathology 75, 76 and 77, Physiology 78, 79 and 80).

## AGRICULTURAL CHEMISTRY. (Major.)

Professor CHARLES A. PETERS, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

| Course. | Number. | Credit. |
|---|---|---|
| Chemistry, . . . . . . . | 51 **I.** | 8 |
| Chemistry, . . . . . . . | 52 **II.** | 8 |
| Chemistry, . . . . . . . | 60 **I.** | 3 |
| Chemistry, . . . . . . . | 61 **II.** | 3[1] |
| Chemistry, . . . . . . . | 62 **III.** | 5 |
| Chemistry, . . . . . . . | 65 **III.** | 5 |
| Chemistry, . . . . . . . | 76 **I.** | 5 |
| Chemistry, . . . . . . . | 77 **II.** | 3 |
| Chemistry, . . . . . . . | 80 **I.** | 5 |
| Chemistry, . . . . . . . | 87 **III.** | 3 |
| Chemistry, . . . . . . . | 90 **II.** | 3[2] |
| Chemistry, . . . . . . . | 92 **II.** | |
| Chemistry, . . . . . . . | 94 **II.** | |
| Chemistry, . . . . . . . | 91 **III.** | 5 |
| Chemistry, . . . . . . . | 93 **II.** | |
| Chemistry, . . . . . . . | 95 **III.** | |
| | | 54[3] |

| Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|
| **I.** | Chemistry 25, . . . | 3 | Chemistry 51, . . . | 8 | Chemistry 76, . . . | 5 |
| | German 25 or 28, . . | 3 | Chemistry 60, . . . | 3 | Chemistry 80, . . . | 5 |
| **II.** | Chemistry 26, . . . | 3 | Chemistry 52, . . . | 8 | Chemistry 77, . . . | 3 |
| | German 26 or 29, . . | 3 | Chemistry 61, . . . | 3[1] | Chemistry 90, 92, 94, . | 3[2] |
| | Entomology 26, . . | 3 | | | | |
| **III.** | Chemistry 27, . . . | 5 | Chemistry 62, . . . | 5 | Chemistry 91, 93, 95, . | 5 |
| | German 27 or 30, . . | 3 | Chemistry 65, . . . | 5 | Chemistry 87, . . . | 3 |
| | Entomology 27, . . | 2 | | | | |
| **IV.** | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Chemistry 25, 26 and 27.

ADVISED. — German 25 or 28, 26 or 29, 27 or 30, Entomology 26 and 27.

ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left for the student to choose.

[1] Course 61 is given as a 5-credit course in 1916-17.

[2] Courses 90, 92, 94 may be changed from 3 credits to an option of 3 or 5 credits in 1917-18.

[3] To get the allowed 45 credits the student will select one of the following groups of courses: 90 and 91, or 92 and 93, or 94 and 95, together with the balance from courses shown above.

## ECONOMIC ENTOMOLOGY. (Major.)

Professor HENRY T. FERNALD, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. |
|---|---|---|
| Botany, | 50 **I.** | 2 |
| Botany, | 51 **II.** | 2 |
| Entomology, | 50 **I.** | 3 |
| Entomology, | 51 **II.** | 3 |
| Entomology, | 52 **III.** | 3 |
| Entomology, | 75 **III.** | 4 |
| Entomology, | 76 **I.** | 5 |
| Entomology, | 77 **II.** | 3 |
| Entomology, | 78 **III.** | 4 |
| Entomology, | 90 **II.** | 3 |
| Zoölogy, | 50 **I.** | 3 |
| Zoölogy, | 51 **II.** | 3 |
| Zoölogy, | 52 **III.** | 3 |
| Zoölogy, | 54 **II.** | 3 |
| | | 38 |

| Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|
| I. | French 25-28, or German 25-28, | 3 | Botany 50, | 2 | Entomology 76, | 5 |
| | Chemistry 25, | 3 | Zoölogy 50, | 3 | | |
| | | | Entomology 50, | 3 | | |
| II. | French 26-29, or German 26-29, | 3 | Zoölogy 51, | 3 | Entomology 77, | 3 |
| | Entomology 26, | 3 | Entomology 51, | 3 | Zoölogy 76, | 3 |
| | Botany 26, | 3 | Botany 51, | 2 | Entomology 90, | 3 |
| | | | Chemistry 61, | 3 | | |
| III. | French 27-30, or German 27-30, | 3 | Zoölogy 52, | 3 | Entomology 78, | 4 |
| | Entomology 27, | 2 | Entomology 52, | 3 | Entomology 75, | 4 |
| | Chemistry 27, | 5 | | | | |
| IV. | | | | | | |

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Entomology 26 and 27, Botany 26.

ADVISED. — French or German 25 or 28, 26 or 29, 27 or 30, Chemistry 25, 27 and 61.

ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left for the student to choose. Juniors are advised to take Entomology 60. In 1916-17 Entomology 26 and 27 will be taken by juniors as part of their major. Beginning 1917-18 the regular junior courses 50, 51 and 52 will be in operation.

## Microbiology. (Major.)

Professor Charles E. Marshall, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

| Course. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Chemistry, | 51 **I.** | 8 | **I.** | Chemistry 25, | 3 | Microbiology 50, | 5 | Microbiology 81, | 5 |
| Chemistry, | 52 **II.** | 8 | | German or French 25 or 28, | 3 | Microbiology 51, | 5 | Microbiology 82, | 5 |
| Microbiology, | 50 **I.** | | | | | Chemistry 51, | 8 | Microbiology 83, | 5 |
| or | | 5 | | | | | | | |
| Microbiology, | 50 **III.** | | **II.** | German or French 26 or 29, | 3 | Microbiology 51, | 5 | Microbiology 75, | 5 |
| Microbiology, | 51 **I.** | | | | | Chemistry 52, | 8 | Microbiology 80, | 5 |
| or | | | | | | | | Dairying 75, | 5 |
| Microbiology, | 51 **II.** | 5 | | | | | | | |
| or | | | | | | | | | |
| Microbiology, | 51 **III.** | | **III.** | Chemistry 27, | 5 | Microbiology 50, | 5 | Microbiology 76, | 5 |
| Microbiology, | 52 **III.** | 5 | | German or French 27 or 30, | 3 | Microbiology 51, | 5 | | |
| Microbiology, | 81 **I.** | | | Physics 27, | 5 | Microbiology 52, | 5 | | |
| or | | | | | | | | | |
| Microbiology, | 82 **I.** | 5 | **IV.** | | | | | | |
| or | | | | | | | | | |
| Microbiology, | 83 **I.** | | | | | | | | |
| Microbiology, | 80 **II.** | | | | | | | | |
| or | | | | | | | | | |
| Microbiology, | 75 **II.** | 5 | | | | | | | |
| or | | | | | | | | | |
| Dairying, | 75 **I.** | | | | | | | | |
| | | 41 | | | | | | | |

Sophomore Elective (Recommendations). — German or French 25 or 28, 26 or 29, 27 or 30, Chemistry 25 and 27, and Physics 27.

Additional Information. — The rest of the sophomore electives allowed are left for the student to choose. Microbiology 51, fall term, will be taken by students who have had Microbiology 50 the preceding spring, and by those who are permitted to omit Microbiology 50.

## RURAL JOURNALISM. (Major.)

Associate Professor ROBERT W. NEAL, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Rural Journalism, | 50 **I.** | 3 | **I.** | | | Journalism 50, | 3 | Journalism 77, | 3 |
| Rural Journalism, | 51 **II.** | 3 | | | | [Journalism 53, | 3] | Journalism 80, | 4(5) |
| | | | | | | Agricultural Economics 51, | 5 | | |
| Two out of three: — | | | | | | | | | |
| [Rural Journalism, | 53 **I.** | 3] | **II.** | Economics and Sociology 26, | 5 | Journalism 51, | 3 | Journalism 77, | 3 |
| Rural Journalism, | 54 **II.** | 3 | | | | Journalism 54, | 3 | Journalism 81, | 4(5) |
| Rural Journalism, | 55 **III.** | 3 | | | | Economics and Sociology 51, | 5 | | |
| Two out of three: — | | | | | | | | | |
| Rural Journalism, | 77 **I.** | 3 | **III.** | | | Journalism 55, | 3 | [Journalism 77, | 3] |
| Rural Journalism, | 78 **II.** | 3 | | | | | | Journalism 82, | 4(5) |
| Rural Journalism, | 79 **III.** | 3 | | | | | | | |
| All: — | | | | | | | | | |
| Rural Journalism, | 80 **I.** | 4 (5) | | | | | | | |
| Rural Journalism, | 81 **II.** | 4 (5) | | | | | | | |
| Rural Journalism, | 82 **III.** | 4 (5) | | | | | | | |
| Agricultural Economics, | 51 **I.** | 5 | **IV.** | | | | | | |
| Economics and Sociology, | 51 **II.** | 5 | | | | | | | |
| Courses to be individually prescribed for remainder of 45 hours. | | 5 | | | | | | | |
| | | 45 | | | | | | | |

SOPHOMORE PREREQUISITES. — All sophomore English; Economics and Sociology 26. II.

SOPHOMORE RECOMMENDATIONS. — French or German 25 (28), 26 (29), 27 (30); Drawing 25. *For agricultural journalism especially:* Animal Husbandry 25, 26, Chemistry 30, Entomology 26, 27.

ADVISED. — French or German at least two years in college; at least two courses in literature; Music; Landscape 75, 78; Chemistry 87; Entomology 90; Microbiology 50; (Veterinary 78); Zoölogy 27; Geology 27; Agricultural Education 50, 53; Rural Sociology 50, 72; other courses in Economics and Sociology, Rural Sociology, Agricultural Economics, History and Government. *Especially for agricultural journalism:* Agronomy 50, 51; Animal Husbandry 51; Dairying 50 or 77; Farm Management 75 (76); Poultry 50; Rural Engineering 75, 76; Horticulture 27, 75; Forestry 52; Market Gardening 50; Pomology 53; Mathematics (75), 77; Veterinary 78; other courses in the economics and the sociology departments bearing on rural problems.

### AGRICULTURAL ECONOMICS. (Major.)

Professor ALEXANDER E. CANCE, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Agricultural Economics, | 50 **I.** | 5 | **I.** | | | Agricultural Economics 50, | 5 | Agricultural Economics 75, | 5 |
| Agricultural Economics, | 52 **II.** | 5 | | | | | | | |
| Agricultural Economics, | 75 **I.** | 5 | | | | | | | |
| Agricultural Economics, | 76 **II.** | | **II.** | | | Agricultural Economics 52, | 5 | Agricultural Economics 76, | 5 |
| or | | 5 | | | | Rural Sociology 51, | 3 | Rural Sociology 78, | 5 |
| Agricultural Economics, | 77 **III.** | | | | | Economic Sociology 51, | 5 | | |
| Economic Sociology, | 51 **II.** | 5 | | | | | | | |
| Economic Sociology, | 52 **III.** | 5 | **III.** | | | Economic Sociology 52, | 5 | Farm Management 76, | 5 |
| Farm Management, | 76 **III.** | 5 | | | | Rural Sociology 52, | 3 | Agricultural Economics 77, | 5 |
| Rural Sociology, | 51 **II.** | 3 | | | | | | | |
| Rural Sociology, | 52 **III.** | 3 | **IV.** | | | | | | |
| Rural Sociology, | 78 **II.** | 5 | | | | | | | |
| | | 46 | | | | | | | |

ADDITIONAL INFORMATION. — The sophomore electives are left to the student to choose.

## AGRICULTURAL EDUCATION. (Major.)

Professor WILLIAM R. HART, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Agricultural Education, | 50 **I.** | 5 | **I.** |  |  | Botany 50, | 2 | Agronomy 75, | 5 |
| Agricultural Education, | 51 **II.** | 5 |  |  |  | Agricultural Education 50, | 5 | Poultry 50, | 3 |
| Agricultural Education, | 52 **IV.** | 5 |  |  |  | Agronomy 50, | 5 | Dairying 77, | 5 |
|  |  |  |  |  |  | Pomology 50, | 3 |  |  |
| Agricultural Education, | 53 **III.** | 5 | **II.** |  |  | Agricultural Education 51, | 5 | Farm Management 75, | 3 |
| Agronomy, | 50 **I.** | 5 |  |  |  | Botany 51, | 2 |  |  |
| Agronomy, | 75 **I.** | 5 |  |  |  |  |  |  |  |
| Botany, | 50 **I.** | 2 | **III.** |  |  | Market Gardening 50, | 3 |  |  |
| Botany, | 51 **II.** | 2 |  |  |  | Agricultural Education 53, | 5 |  |  |
| Dairying, | 77 **I.** | 5 |  |  |  |  |  |  |  |
| Farm Management, | 75 **II.** | 3 | **IV.** |  |  | Agricultural Education 52, | 5 |  |  |
| Market Gardening, | 50 **III.** | 3 |  |  |  |  |  |  |  |
| Pomology, | 50 **I.** | 3 |  |  |  |  |  |  |  |
| Poultry Husbandry, | 50 **I.** | 3 |  |  |  |  |  |  |  |
|  |  | 51 |  |  |  |  |  |  |  |

ADDITIONAL INFORMATION. — The sophomore electives allowed are left to the student to choose.

Substitutions of other technical courses for some of those above mentioned may be made to meet the needs of individual students.

A selection is allowed of Poultry Husbandry 50 and Market Gardening 50, making 6 credits, or Agronomy 75, 5 credits, making the total credits 45 or 46.

## RURAL SOCIOLOGY. (Major.)

Professor JOHN PHELAN, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

| COURSE. | Number. | Credit. | Term. | Sophomore. | Credit. | Junior. | Credit. | Senior. | Credit. |
|---|---|---|---|---|---|---|---|---|---|
| Agricultural Economics,<br>Agricultural Economics,<br>Economics and Sociology,<br>Economics and Sociology, | 50 **I.**<br>52 **II.**<br>51 **II.**<br>75 **I.** | 5<br>5<br>5<br>5 | **I.** | | | Agricultural Economics 50,<br>Rural Sociology 50, | 5<br>3 | Rural Sociology 75,<br>Economics and Sociology 75, | 3<br>5 |
| Economic Sociology,<br>Rural Journalism, | 76 **III.**<br>55 **III.** | 5<br>3 | **II.** | | | Rural Sociology 51,<br>Agricultural Economics 52,<br>Agricultural Education 52,<br>Economic Sociology 51, | 3<br>5<br>5<br>5 | Rural Sociology 77,<br>Rural Sociology 78, | 3<br>5 |
| Rural Sociology,<br>Rural Sociology,<br>Rural Sociology, | 50 **I.**<br>52 **III.**<br>51 **II.** | 3<br>3<br>3 | **III.** | | | Rural Journalism 55,<br>Rural Sociology 52, | 3<br>3 | Rural Sociology 75,<br>Economic Sociology 76, | 3<br>5 |
| Rural Sociology,<br>Rural Sociology,<br>or<br>Rural Sociology, | 77 **II.**<br>75 **I.**<br><br>75 **III.** | 3<br><br>3 | **IV.** | | | | | | |
| Agricultural Education,<br>or<br>Rural Sociology, | 52 **II.**<br><br>78 **II.** | 5 | | | | | | | |
| | | 48 | | | | | | | |

ADDITIONAL INFORMATION. — The sophomore electives allowed are left to the student to choose.

# DESCRIPTION OF COURSES.

## DIVISION OF AGRICULTURE.

Professor Foord.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

### Agronomy.

Assistant Professor Jones, Assistant Professor Abbott, Mr. Merkle, Mr. Cobb, Mr. Purington.

*Required Course.*

1. **I. and II.** Agronomy. — Freshman. Given as part of the freshman agriculture and horticulture. This course aims, by actual contact with the plants and their products, to make the student familiar with the most common farm crops of Massachusetts and their uses. The crops studied are maize, cereals, grasses, legumes, potatoes and root crops. Six weeks, part of class only, first term; balance of class, six weeks during the second term.

2 2-hour laboratory periods, credit, 1.
Assistant Professor Jones and Assistants.

27. **III.** Soils and Fertilizers. — Sophomores. A study of soils and their properties, soil management, methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments.

4 class hours. 1 2-hour laboratory period, credit, 5.
The Department.

Prerequisite, freshman required Chemistry.

*Elective Courses.*

50. **I.** Field and Forage Crops. — For juniors; seniors may elect. History, classification and production of maize and of those grasses, legumes, forage and root crops suited to New England conditions. The work includes lecture, laboratory and field study of these various crops.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Jones and the Department.

Prerequisites, Agronomy 27, Botany 3.

51. **III.** Advanced Field Crops. — For juniors; seniors may elect. A study of the cereals and the minor farm crops not considered in Course 50. Laboratory work includes a study of the quality of seeds and grains, the grading and judging of farm crop products and field work with such crops as are available, especially mowings and pastures.

3 class hours. 2 2-hour laboratory periods, credit 5.
Assistant Professor Jones and the Department.

Prerequisite, Agronomy 50.

75. **I.** Advanced Soils. — For seniors; juniors may elect. A field, lecture and laboratory course on soils and their adaptability to different uses. The field work consists of a detailed study of soil textures, natural and spontaneous vegetation and other factors which indicate the fertility and adaptation of the soil; followed by a laboratory study of the physical properties of the soils sampled.
2 class hours. 3 2-hour laboratory periods, credit 5.
———— and Mr. Merkle.

Prerequisite, Agronomy 27.

76. **III.** Drainage and Irrigation. — For seniors; juniors may elect. A field and lecture course on soil improvement by drainage and irrigation, with special reference to problems of this nature as faced by Massachusetts farmers.
2 class hours. 1 2-hour and 1 4-hour laboratory period, credit, 5.
The Department.

Prerequisites, Mathematics 26 and 27, Agronomy 27.

77. **II.** Manures and Fertilizers. — Seniors. An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Considerable attention is devoted to consideration of the experimental work which has been done, and which is now in progress. The laboratory work consists of a study of fertilizers, fertilizer mixtures, limes and water culture work.
4 class hours. 1 2-hour laboratory period, credit 5.
Assistant Professor Abbott.

Prerequisite, Agronomy 27.

78. **II.** Breeding of Field Crops. — Seniors. This course deals with the improvement, by selection and breeding, of the crops studied in Courses 50 and 51.
3 class hours.
Assistant Professor Jones.

Prerequisite, Agronomy 51.

## Animal Husbandry.

Professor McNutt, Assistant Professor Quaife, Mr. Fish.

### *Required Course.*

1. **I and II.** Animal Husbandry. — Freshman. Given as part of the freshman agriculture and horticulture. This course is outlined to give the student a greater appreciation of animal husbandry. Demonstrations will be given and judging will be done to familiarize the student with the various breeds and market classes. Six weeks, part of class only, first term; balance of class, six weeks during the second term.
2 2-hour laboratory periods, credit, 1.
Animal Husbandry Department.

*Elective Courses.*

25. **I.** Breeds and Types of Live Stock. — Sophomores. A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Textbook, Plumb's "Breeds and Types of Farm Animals."

2 lectures. 1 2-hour laboratory period, credit, 3.

Assistant Professor Quaife.

26. **II.** Breeds and Types of Live Stock. — Sophomores. Continuation of Course 25.

2 lectures. 1 2-hour laboratory period, credit, 3.

Assistant Professor Quaife.

Prerequisite, Animal Husbandry 25.

50. **II.** Live Stock Management. — For juniors; seniors may elect. The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, harnessing, casting and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work.

1 2-hour laboratory period, credit, 1.

Assistant Professor Quaife.

Prerequisites, Animal Husbandry 25 and 26.

51. **III.** Principles of Breeding. — For juniors; seniors may elect. This course is designed to familiarize the student with the problems that are involved in animal improvement; to acquaint him with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; DeVrie's theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live-stock improvement. "Genetics," by Herbert E. Walter. Supplementary reading.

3 class hours. Credit, 3.

Professor McNutt.

Prerequisite, Zoölogy 25.

52. **III.** Advanced Stock Judging. — For juniors; seniors may elect. This course is designed to equip animal husbandry students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits will be made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected from this class.

1 2-hour and 1 4-hour laboratory period, credit, 3.

Professor McNutt.

Prerequisite, Animal Husbandry 50.

75. **I.** Feeding and Management. — For seniors; juniors may elect. A study of the principles of animal nutrition; of the composition and qualities of feeding materials. Textbook, Henry's "Feeds and Feeding."
3 class hours. Credit, 3.
Assistant Professor Quaife.

Prerequisite, Chemistry 30 or 51.

76. **II.** Feeding and Management. — For seniors; juniors may elect. A study of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production. Textbook, Henry's "Feeds and Feeding."
3 class hours. Credit, 3.
Professor McNutt.

Prerequisite, Chemistry 30 or 51.

77. **III.** Feeding and Management. — For seniors; juniors may elect. A continuation of Courses 75 and 76, dealing in a similar manner with horses, sheep, beef cattle and swine.
3 class hours. Credit, 3.
Assistant Professor Quaife.

Prerequisite, Animal Husbandry 75.

78. **II.** Herd and Stud-book Study. — For seniors; juniors may elect. An advanced course in the study of the breeds of live stock, familiarizing the student with the detailed history of the breed, the most productive sires and dams of the various breeds, and the successful lines and methods of breeding.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor McNutt.

Prerequisite, Animal Husbandry 75.

80. **III.** Seminar. — For seniors majoring in animal husbandry only. Advanced study upon questions pertaining to live stock and live-stock production. Each student electing this work will choose some particular line of work in which he is specially interested, and will pursue study in this subject by reading, compilation and research. There will be no regular lecture period, but seminars will be held. A satisfactory report of the results must be presented in a thesis.
1 2-hour laboratory period, credit, 1.
Professor McNutt.

## Dairying.

Professor Lockwood, Assistant Professor Jamison, Mr. Coons, Mr. Drain.

*Elective Courses.*

50. **I.** Milk and Milk Composition. — For juniors; seniors may elect. The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for

fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor JAMISON and the DEPARTMENT.

51. **III.** BUTTER MAKING. — For juniors; seniors may elect. A study of separators and cream separation; handling milk and cream for butter making; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof.
2 class hours. 2 3-hour laboratory periods, credit, 5.
Mr. COONS and the DEPARTMENT.
Prerequisite, Dairying 50.

75. **II.** MARKET MILK. — For seniors; juniors may elect. A study of market-milk conditions; extent and development of the business; supply and delivery; food value of milk and its uses as food; milk and its relation to the public health; proper methods for handling milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor LOCKWOOD and the DEPARTMENT.
Prerequisite, Dairying 50.

76. **III.** MILK PRODUCTS. — For seniors; juniors may elect. The manufacture of milk products other than butter, including cheddar cheese, soft and fancy cheese, ice cream, condensed milk, casein, milk powder, etc. Laboratories, largely the making of soft and fancy cheese and ice cream.
2 class hours. 2 3-hour laboratory periods, credit, 5.
Mr. DRAIN.
Prerequisite, Dairying 75.

77. **I.** DAIRYING. — For seniors; juniors may elect. A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary butter making; proper methods of handling milk and cream; and the relation of market milk to the public health.
3 lecture hours. 2 2-hour laboratory periods, credit, 5.
Mr. DRAIN and the DEPARTMENT.

### Farm Management.

Professor FOORD, Mr. PEACOCK.

*Elective Courses.*

75. **II.** FARM COST ACCOUNTING. — For seniors; juniors may elect. A study of farm inventories, single-enterprise accounts, complete farm accounts, and farm records. Special emphasis is given to the interpretation of results and their application in the organization and management of the farm.
1 class hour. 2 2-hour laboratory periods, credit 3.
Professor FOORD, Mr. PEACOCK.

76. **III.** Farm Management. — For seniors; juniors may elect. The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Professor Foord.

Prerequisites, Agronomy 50, Animal Husbandry 25 and 26.

## Poultry Husbandry.

Professor Graham, Dr. Goodale, Assistant Professor Payne, Mr. Rucker.

### *Required Course.*

1. **I. and II.** Poultry Husbandry. — Freshman. Given as part of the freshman agriculture and horticulture. This course consists of a study of the characteristics of the most important breeds and varieties of poultry based upon the classification in the Standard of Perfection. This will embrace both standard and utility qualities. The work on comparison will be based on the key. A special score card will be used for utility judging. Attention will be given to the adaptation of the most popular varieties, to the more highly specialized lines of poultry culture, and to the part played by poultry in New England agriculture. Six weeks, part of class only, first term; balance of class, six weeks during the second term.

2 2-hour laboratory periods, credit, 1.

The Department.

### *Elective Courses.*

50. **I.** Elements of Poultry Culture. — For juniors; seniors may elect. This course consists of a comprehensive study of opportunities in poultry culture, poultry-house construction, poultry-house equipment, feeds and feeding, winter-egg production, types and breeds of poultry.

3 class hours. Credit, 3.

Professor Graham, Assistant Professor Payne and Mr. Rucker.

51. **I.** Poultry Practice Work. — For juniors; seniors may elect. This is a practical laboratory course in poultry carpentry, caponizing, killing and picking; dressing and packing poultry; sorting and preparing eggs for market.

2 2-hour laboratory periods, credit, 2.

Assistant Professor Payne.

Prerequisite, must be accompanied by Poultry 50.

52. **II.** Elements of Poultry Culture. — For juniors; seniors may elect. This course treats the subjects of incubation, brooding, care of growing stock, breeding, market poultry, including capons, roasters and broilers, and diseases of poultry.

3 class hours. Credit, 3.

Assistant Professor Payne and Mr. Rucker.

Prerequisite, Poultry 50.

53. **III.** Incubation and Brooding. — For juniors; seniors may elect. In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg and the care of sitting hens. Laboratory time by arrangement.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Assistant Professor Payne.

Prerequisite, Poultry 52.

54. **III.** Pen Management. — For juniors; seniors may elect. This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls and profit and loss.
1 2-hour laboratory period, credit, 1.
Mr. Payne.

Prerequisite, Poultry 50.

55. **I., II. and III.** Investigational Work. — Seniors. This course is designed especially for students who are planning to do experiment station work. Students will be assigned specific problems to work out experimentally, or they may be required to assist in carrying on such work.
1 to 5 2-hour laboratory periods, credits, 1 to 5.
Dr. Goodale.

75. **II.** Poultry Management. — Seniors. A detailed study of large poultry farms and their equipment, such as bone cutters, feed cutters, cramming machines, etc.; the laying out and planning of poultry buildings of all kinds; mating of fowls. Attention to poultry diseases and investigation work carried on by experiment station is prominent. A few good poultry plants will be visited by the class for practical demonstrations.
5 class hours. Credit, 5.
Professor Graham.

Prerequisites, Poultry 53, 54, 76 and 77.

76. **I.** Advanced Poultry-Judging. — Seniors. This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Mr. Rucker.

Prerequisite, Poultry 53.

77. **I.** Market Poultry and Poultry Products. — Seniors. This course includes the study of market classifications of poultry, eggs and feathers, the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Payne.

Prerequisites, Poultry 50, 51 and 52.

## Rural Engineering.

Professor Gunness.

*Elective Courses.*

25. **I.** Carpentry. — For sophomores; juniors and seniors may elect. Practice in the use of tools by exercises in bench work, repair of farm equipment and farm building construction.

2 2-hour laboratory periods, credit, 2.
Rural Engineering Department.

26. **II.** Repair of Farm Equipment. — For sophomores; juniors and seniors may elect. Exercises in forge work, pipe fitting, soldering. Practice in the use of machinists' tools, such as file, cold chisel, drill press, taps and dies.

2 2-hour laboratory periods, credit, 2.
Rural Engineering Department.

75. **I.** Farm Structures. — For seniors; juniors may elect. Study of the strength, durability and cost of building materials; water supply; lighting and heating systems for the farm; drawing plans, writing specifications and estimating the cost of buildings; concrete construction as applied to foundations, silos, tanks, posts, floors and walks.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Gunness.

76. **I.** Farm Mechanics. — For seniors; juniors may elect. A general study of the farm equipment; farm buildings, their location, plan and arrangement; water supply; sewage disposal; lighting and heating systems; farm power and farm machinery. Course 76 has been planned for the benefit of those students who want a general course in farm mechanics but cannot spend the time to take the two courses 75 and 78.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Gunness.

77. **II.** Power Machinery. — For seniors; juniors may elect. Steam and gasoline engines, refrigerating machinery, electric motors and dynamos. Practice in pipe fitting, soldering, babbitting and fitting bearings, lacing belts and packing valves. Course 77 is intended primarily for dairy students, but would be valuable to any man who would expect to use engines, pumps or electrical machinery.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor Gunness.

78. **III.** Farm Machinery. — For seniors; juniors may elect. Study of the care and operation of tillage, seeding, harvesting, pumping and spraying machinery; steam and gas engines. Special attention will be given to the use of power on the small farm. Practice in the adjustment of the various machines, babbitting and fitting bearings, lining shafts and pulleys, lacing belts, splicing rope and packing valves.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor Gunness.

## DIVISION OF HORTICULTURE.

Professor Waugh, Assistant Professor Thompson, Assistant Professor Wheeler.

[The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.]

### *Required Course.*

1. **I. and II.** Horticulture. — Freshman (part of freshman agriculture and horticulture). A general introduction to horticulture; principally laboratory work, judging fruits, etc., in class and field. Six weeks with class divided between first and second terms.

2 2-hour laboratory periods, credit, 1.
Assistant Professor Wheeler.

### *Elective Courses (General).*

27. **III.** Nursery Practice. — For sophomores; juniors and seniors may elect. This course treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums.

2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Thompson.

50. **I.** Plant Materials. — For juniors; seniors may elect. This course aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thompson.

Prerequisite, Horticulture 27.

51. **III.** Plant Materials. — For juniors; seniors may elect. A continuation of Course 50, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thompson.

Prerequisite, Horticulture 50.

75. **I.** Plant Breeding. — For seniors and graduate students. [Not given in 1917-18.] This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students

are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops.

3 class hours. 2 2-hour laboratory periods, credit, 5.

———————.

Prerequisite, open only to students well prepared in agricultural or horticultural subjects.

### Floriculture.

Associate Professor Nehrling, Mr. Wildon.

*Elective Courses.*

50. **I.** Greenhouse Management. — For juniors; seniors may elect. This course is designed to familiarize students with the methods followed in the management of greenhouse crops. The students are instructed in the practical operations of watering, potting, fumigating, ventilating and in the methods of propagation of plants by seed and cuttings. They will also be expected to arrange their hours according to the needs of the work.

2 class hours. 1 4-hour laboratory period, credit, 4.

Associate Professor Nehrling and Mr. Wildon.

Prerequisite, Horticulture 27.

51. **II.** Greenhouse Management. — For juniors; seniors may elect. Continuation of Course 50. In addition, work in the use of cut flowers and plants in decorative work, the arrangement of flowers in baskets, designs, vases, table and home decorations will be considered.

2 class hours. 1 4-hour laboratory period, credit, 4.

Associate Professor Nehrling and Mr. Wildon.

Prerequisite, Floriculture 50.

52. **III.** Greenhouse Management. — For juniors; seniors may elect. A continuation of Courses 50 and 51.

2 class hours. 1 4-hour laboratory period, credit, 4.

Associate Professor Nehrling and Mr. Wildon.

Prerequisite, Floriculture 51.

53. **I.** Greenhouse Construction. — For juniors; seniors may elect. The location, arrangement, construction, cost, heating and ventilating of greenhouse structures; also the drawing of plans and drafting of specifications for commercial houses and private ranges. Such practical work as glazing, the construction of concrete benches and cold frames will be included in this course.

2 class hours. 1 2-hour laboratory period, credit, 3.

Associate Professor Nehrling and Mr. Wildon.

Prerequisite, should be taken with Floriculture 50.

54. **II.** Greenhouse Construction. — For juniors; seniors may elect. A continuation of Course 53.

2 class hours. 1 2-hour laboratory period, credit, 3.

Associate Professor Nehrling and Mr. Wildon.

Prerequisite, Floriculture 53.

75. **I.** COMMERCIAL FLORICULTURE. — Seniors. A detailed study will be made of the methods of culture for greenhouse plants and cut flowers for wholesale and retail markets. The care and marketing of all florists' crops will also be considered. Assigned readings on these topics.
2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor NEHRLING.
Prerequisite, Floriculture 52.

76. **III.** COMMERCIAL FLORICULTURE. — Seniors. As stated under Course 75.
2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor NEHRLING.
Prerequisites, Floriculture 75 and 80.

77. **II.** CONSERVATORY WORK AND DECORATIVE PLANTS. — Seniors. A study of the tropical and subtropical foliage and flowering plants used in conservatory work. Their arrangement and care will also be considered. Assigned readings.
2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor NEHRLING.
Prerequisite, Floriculture 75.

78. **III.** GARDEN FLOWERS AND BEDDING PLANTS. — Juniors and seniors. This course aims to make the student familiar with those annuals, herbaceous perennials, bulbs and bedding plants used in landscape work. Their propagation, culture and uses will be considered. Assigned readings and field trips.
2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor NEHRLING and Mr. WILDON.

79. **III.** SEMINAR. — For seniors majoring in floriculture only. Advanced study of subjects pertaining to commercial floriculture or private garden work. All students electing this work will be assigned a specific problem, and will pursue study in these problems by reading and research. No regular lectures will be given, but seminars will be conducted each week. A satisfactory report of the results must be presented.
2 to 6 laboratory hours. Not to exceed 3 credits.
Associate Professor NEHRLING.

80. **II.** COMMERCIAL FLORICULTURE. — Seniors. As stated under Course 75.
2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor NEHRLING and Mr. WILDON.
Prerequisite, Floriculture 75.

## Forestry.

Professor Clark.

*Elective Courses.*

50. **I.** Dendrology. — For juniors; seniors may elect. During the first part of the term frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Lectures, recitations, laboratories or field work at option of instructor.

3 2-hour laboratory periods, credit, 3.
Professor Clark.

51. **II.** Wood Technology. — For juniors; seniors may elect. A study of the commercial woods found in the lumber markets, methods of identification, uses, strength values, technical qualities, decay and methods of preservation.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Clark.

52. **III.** Principles of Forestry. — For juniors; seniors may elect A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Not required of students who propose to major in forestry.

2 class hours. Credit, 2.
Professor Clark.

53. **III.** Silviculture. — For juniors; seniors may elect. Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting.

1 class hour. 1 4-hour laboratory period, credit, 3.
Professor Clark.

Prerequisite, Forestry 50.

54. **IV.** Arboriculture. — For juniors; seniors may elect. A course dealing with problems of shade tree propagation, protection and repair; the choice and grouping of species; shade tree laws. Assigned readings.

120 hours' field work, credit, 5.
Professor Clark.

75. **I.** Forest Mensuration. — For seniors; juniors may elect. Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating.

3 class hours. 72 hours' field work, credit, 5.
Professor Clark.

78. **III.** Seminar — Report. — Seniors. This may involve research, laboratory or field work in the investigation of some subject, together with a

review of the literature relating to it and an original written report evidencing the results. Subject to be chosen in conference with Professor Clark.

6 laboratory hours, credit, 3.
Professor CLARK.

## Landscape Gardening.

Professor WAUGH, Assistant Professor HARRISON.

### *Elective Courses.*

50. **I.** ELEMENTS OF LANDSCAPE GARDENING. — Juniors. Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Must be followed by Course 51.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.
Professor WAUGH.

Prerequisites, Mathematics 25 and 26, Drawing 25, 26 and 27, Horticulture 27.

51. **II.** ELEMENTS OF LANDSCAPE GARDENING. — Juniors. As stated under Course 50.

3 3-hour laboratory periods, credit, 4.
Assistant Professor HARRISON.

Prerequisite, Landscape Gardening 50.

52. **III.** GENERAL DESIGN. — Juniors. Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports on individual problems. Must be followed by Course 53.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.
Assistant Professor HARRISON.

Prerequisites, Landscape Gardening 50 and 51, and either plant materials (Horticulture 50 and 51) or advanced mathematics.

53. **IV.** (Summer.) GENERAL DESIGN. — Juniors. As stated under Course 52.

120 laboratory hours, credit, 5.
Assistant Professor HARRISON.

Prerequisite, Landscape Gardening 52.

75. **I.** THEORY OF LANDSCAPE ART. — For seniors and graduates. The general theory and applications of landscape study, including a brief history of the art.

3 class hours. Credit, 3.
Professor WAUGH.

76. **II.** CIVIC ART. — Seniors. The principles and applications of modern civic art, including city planning, city improvement, village improvement and rural improvement, with special emphasis upon country planning. Must be followed by Course 77.

3 3-hour laboratory periods, credit, 4.
Professor WAUGH.

Prerequisite, Landscape Gardening 53.

77. **III.** Civic Art. — Seniors. As stated under Course 76.
3 3-hour laboratory periods, credit, 4.
Professor Waugh.

Prerequisite, Landscape Gardening 76.

78. **III.** Architecture. — Alternating with Course 79; given in 1916-17. Juniors and seniors. The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing.
3 class hours. Credit, 3.
Assistant Professor Harrison.

79. **III.** Construction and Maintenance. — Alternating with Course 78; given in 1917-18. Juniors and seniors. Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc.
3 class hours. Credit, 3.
Assistant Professor Harrison.

## Market Gardening.

Professor Tompson, Assistant Professor Thomson.

### *Elective Courses.*

50. **III.** Elements of Market Gardening. — Juniors; seniors may elect. A study of the business of commercial vegetable growing to acquaint the student with the fundamental considerations of the business and a knowledge of the market-garden crops. The study of the crops will consist of classroom, laboratory and field work, dealing with propagation, cultivation and marketing. Text and reference books.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thomson.

75. **I.** Elements of Market Gardening. — Seniors. A continuation of Market Gardening 50. A systematic study of types, varieties and strains of the leading vegetable crops, as well as a study of the problems of farm planning, irrigation, crop rotation, spraying, storage and methods of marketing and seed production. Text and reference books. Occasional seminars. Laboratory and field work.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thomson.

Prerequisite, Market Gardening 50.

76. **II.** Greenhouse Vegetable Growing. — Seniors. A study of the production of vegetables under glass as a business, briefly considering economic reasons for its development, progress in methods and management and the present status of the industry. A study of vegetable-forcing house construction, heating and greenhouse management, as applied to the leading green-

house crops, lettuce, cucumbers and tomatoes, with proportionate time given to the crops of lesser importance. Text and reference books and periodicals. Greenhouse work in actual production and management is a part of this course, and the student must so arrange that he can give it adequate attention. Considerable seminar work.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thomson.

Prerequisite, Market Gardening 75.

## Pomology.

Professor Sears, Associate Professor Chenoweth.

### *Elective Courses.*

50. **I.** Practical Pomology. — For juniors; seniors may elect. A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery stock, pruning, culture of orchards, orchard fertilizers, cropping orchards, etc. Lectures, supplemented with text and reference books; field and laboratory exercises.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Sears.

Prerequisite, Horticulture 27.

51. **II.** Practical Pomology. — For juniors; seniors may elect. As stated under Course 50.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Sears.

Prerequisite, Pomology 50.

52. **III.** Practical Pomology. — For juniors; seniors may elect. As stated under Course 50.
2 class hours. 1 2-hour laboratory period.
Professor Sears.

Prerequisite, Pomology 51.

53. **IV.** (Summer.) Small Fruits. — For juniors; seniors may elect. The growing, harvesting, marketing and storing of small fruits, including currants, gooseberries and grapes, together with thinning, spraying, picking and marketing of tree fruits at the college orchards and in private commercial orchards.
120 laboratory hours, credit, 5.
Associate Professor Chenoweth.

75. **I.** Systematic Pomology. — Seniors. A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Lectures, laboratory and field exercises.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Chenoweth.

Prerequisite, Pomology 52.

76. **II.** Systematic Pomology. — Seniors. As stated under Course 75.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Chenoweth.

Prerequisite, Pomology 75.

77. **I.** Commercial Pomology. — Seniors only, majoring in pomology. The picking, handling, storing and marketing of fruits, including a discussion of storage houses, fruit packages, methods of grading and packing, manufacturing, etc. Especial emphasis is placed upon laboratory and field work, where the student is given actual practice in the picking and packing of all the principal fruits, together with the manufacture of by-products.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Chenoweth.

Prerequisite, Pomology 52.

78. **III.** Spraying. — Seniors. A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small-fruit plantations.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Sears.

Prerequisite, Pomology 52.

79. **III.** General Pomology. — For seniors; juniors may elect. This course is planned to meet the needs of those students who cannot devote more than one term to the subject but who want a general knowledge of fruit growing. The work will consist of lectures and laboratory exercises on such topics as choosing the locations, kinds and varieties of fruits to grow, securing and setting the plants, care and cultivation, pruning, spraying, pests, harvesting and storing.
2 lectures. 1 2-hour laboratory period, credit, 3.
Associate Professor Chenoweth.

80. **I.** Seminar. — For seniors majoring in pomology. Advanced study of problems relating to the business of fruit growing. Each student will be assigned a major and a minor problem in lines of work in which he is particularly interested. He will pursue his studies both by reading and research, and the materials obtained will be worked into theses which will be presented to the seminar for discussion. Reports on minor problems will be taken up first. No lectures will be given, but seminar meetings will be held for one period each week.
Credit, 1.
Professor Sears and Associate Professor Chenoweth.

81. **II.** SEMINAR. — For seniors majoring in pomology. A continuation of Course 80. One seminar meeting each week.

Credit, 1.

Professor SEARS and Associate Professor CHENOWETH.

82. **III.** SEMINAR. — For seniors majoring in pomology. A continuation of Course 81. One seminar meeting each week.

Credit, 1.

Professor SEARS and Associate Professor CHENOWETH.

## Drawing.

MR. ROOT.

### *Elective Courses.*

25. **I.** FREE-HAND DRAWING. — For sophomores; juniors and seniors may elect. Lettering; free-hand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water-color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink.

3 2-hour laboratory periods, credit, 3.

Mr. Root.

26. **II.** MECHANICAL DRAWING. — For sophomores; juniors and seniors may elect. Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry.

3 2-hour laboratory periods, credit, 3.

Mr. ROOT.

27. **III.** MECHANICAL DRAWING. — For sophomores; juniors and seniors may elect. As stated under Course 26.

3 2-hour laboratory periods, credit, 3.

Mr. ROOT.

Prerequisite, Drawing 26.

## DIVISION OF SCIENCE.

### Botany.

Professor Osmun, Associate Professor Anderson, Assistant Professor Clark, Mr. McLaughlin, Mr. Martin, Mr. White, Mr. Mardfin.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

*Required Courses.*

3. **III.** Morphology and Taxonomy of the Higher Plants (Phanerogamia). — Freshmen. Seeds and seedlings; types of leaves, stems, roots and flowers. Determination and naming of plants, using Gray's "New Manual of Botany." An herbarium of 75 species of plants is required of each student.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun, Mr. McLaughlin, Mr. Martin, Mr. White, Mr. Mardfin.

25. **I.** Anatomy, Physiology and Ecology of the Higher Plants. — Sophomores. Structure, functions, metabolism and environmental relations of seed plants.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun, Mr. McLaughlin, Mr. Martin, Mr. White, Mr. Mardfin.

Prerequisite, Botany 3.

*Elective Courses.*

26. **II.** Morphology and Taxonomy of the Lower Plants (Crytogamia). — Sophomores. Systematic study of typical forms of bacteria, algae, fungi, lichens, mosses, ferns. (Courses 3, 25 and 26 constitute a general elementary course in botany, and are prerequisites of all subsequent work taken in the Department of Botany.)

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun, Mr. McLaughlin, Mr. Martin, Mr. White, Mr. Mardfin.

Prerequisite, Botany 25.

50. **I.** Diseases of Crops. — For juniors; seniors may elect. Laboratory and recitations devoted to diseases of the special crops related to the student's major. Arranged in sections for students specializing in (1) agronomy or market gardening; (2) floriculture or landscape gardening; (3) forestry or pomology; (4) entomology. Students may take the laboratory work in one, two or three sections. The laboratory work for students in entomology is general, and includes the more important diseases studied in the other sections. The class is not sectioned for lectures, which are general.

1 class hour. 1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.
Mr. Martin, Mr. McLaughlin.

Prerequisite, Botany 26.

51. **II.** DISEASES OF CROPS. — For juniors; seniors may elect. As stated under Course 50.
1 class hour. 1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.
Mr. MARTIN, Mr. MCLAUGHLIN.
Prerequisite, Botany 50.

52. **I.** SYSTEMATIC MYCOLOGY. — For juniors; seniors may elect. Morphology and development of typical species representing the orders and families of fungi; practice in identification, collection and preservation of fungi; study of systems of classification; collateral reading. A prerequisite of the senior course in plant pathology, but open to all.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor ANDERSON.
Prerequisite, Botany 26.

53. **II.** SYSTEMATIC MYCOLOGY. — For juniors; seniors may elect. As stated under Course 52.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor ANDERSON.
Prerequisite, Botany 52.

54. **III.** SYSTEMATIC MYCOLOGY. — For juniors; seniors may elect. As stated under Course 52.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor ANDERSON.
Prerequisite, Botany 53.

55. **I.** PLANT HISTOLOGY. — For juniors; seniors may elect. Comparative study of the tissues of plants; training in histological methods, including the use of precision microtomes, methods of killing, fixing, sectioning, staining and mounting; collateral reading and conferences. This course offers valuable training in preparation for further work in botany.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor OSMUN, Mr. MCLAUGHLIN.
Prerequisite, Botany 26.

56. **II.** PLANT HISTOLOGY. — For juniors; seniors may elect. As stated under Course 55.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor OSMUN, Mr. MCLAUGHLIN.
Prerequisite, Botany 55.

75. **I.** PLANT PATHOLOGY. — Seniors. Comprehensive study of diseases of plants; training in laboratory methods and technique, including culture work and artificial inoculation of hosts; miscellaneous diagnosis; study of literature and representative life histories of pathogens. Prepares for civil service, experiment station and college work.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor OSMUN and Associate Professor ANDERSON.
Prerequisite, Botany 54.

76. **II.** PLANT PATHOLOGY. — Seniors. As stated under Course 75.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor OSMUN and Associate Professor ANDERSON.
Prerequisite, Botany 75.

77. **III.** PLANT PATHOLOGY. — Seniors. As stated under Course 75.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor OSMUN and Associate Professor ANDERSON.
Prerequisite, Botany 76.

78. **I.** PLANT PHYSIOLOGY. — Seniors. A general course dealing with such topics as absorption, nutrition, growth and movements of plants; training in laboratory methods and the use of apparatus; collateral reading.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor CLARK.
Prerequisites, Botany 26 and Chemistry 51.

79. **II.** PLANT PHYSIOLOGY. — Seniors. As stated under Course 78.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor CLARK.
Prerequisite, Botany 78.

80. **III.** PLANT PHYSIOLOGY. — Seniors. As stated under Course 78.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor CLARK.
Prerequisite, Botany 79.

82. **II.** CYTOLOGY AND EMBRYOLOGY. — Seniors. Morphology and physiology of the cell; cell-division; embryonal development.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Mr. MCLAUGHLIN.
Prerequisites, Botany 26 and 55.

83. **III.** CYTOLOGY AND EMBRYOLOGY. — Seniors. As stated under Course 82.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Mr. MCLAUGHLIN.
Prerequisite, Botany 82.

86. **I.** SEMINAR. — For seniors and graduate students. Presentation and discussion of important current botanical papers. A major requirement.
1 class hour. Credit, 1.
The DEPARTMENT.

87. **II.** SEMINAR. — For seniors and graduate students. As stated under Course 86.
1 class hour. Credit, 1.
The DEPARTMENT.

88. **III.** SEMINAR. — For seniors and graduate students. As stated under Course 86.
1 class hour or 2 laboratory hours. Credit, 1.
The DEPARTMENT.

## General and Agricultural Chemistry.

Professor Lindsey, Professor Wellington, Professor Chamberlain, Professor Peters, Professor Anderson, Mr. Serex, Mr. Beebe, Mr. Kelly, Mr. MacNeil, Mr. Perry, Mr. A. L. Prince.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the other sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and intending to follow chemistry as a vocation are prepared for positions as instructors in high schools and colleges, in the agricultural experiment stations, the United States Department of Agriculture, as well as in fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take especially graduate work leading to the degree of Master of Science, and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.]

### *Required Courses.*

1. **I.** General Chemistry. — Freshmen. An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." This course is for those students who do not present chemistry for entrance, and who begin the subject in college.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Peters, Mr. Serex, Mr. Beebe and Mr. Prince.

2. **II.** General Chemistry. — Freshmen. A continuation of Course 1. A study of metals and their compounds. The laboratory work is the same as described under Course 4.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Peters and Assistants.

3. **III.** Inorganic Agricultural Chemistry. — Freshmen. As stated under Course 5 **II.**
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Anderson and Assistants.

4. **I.** Advanced General Chemistry. — Freshmen. A review of the fundamental chemical laws, together with the common acid and base-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate, superphosphate, muriate and sulfate of potash, arsenate of lead, Paris green, Bordeaux mixture, lime-sulfur and emulsions.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Anderson and Assistants.
Prerequisite, Entrance Chemistry.

5. **II.** Inorganic Agricultural Chemistry. — Freshmen. A study of the chemical composition, properties and reactions of soils, fertilizers, fungicides and insecticides. The laboratory work is divided into three parts, as

follows: (*a*) qualitative examination of soil, plant ash and superphosphate; (*b*) approximate quantitative determination of moisture, ash, carbonic acid, phosphoric acid, potash, etc.; (*c*) special work on retention of salts by soil, leaching of lime from the soil by carbonated water, etc.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor ANDERSON and Assistants.
Prerequisite, Chemistry 3 or 4.

6. **III.** ORGANIC AGRICULTURAL CHEMISTRY. — Freshmen. As stated in Course 30.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor CHAMBERLAIN and Assistants.
Prerequisites, Chemistry 4 and 5.

### *Elective Courses.*

25. **I.** QUALITATIVE ANALYSIS. — *Basic.* — Sophomores. A course in the systematic analysis of metallic salts, presented from the ionic viewpoint. The student studies closely the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Böttger's "Qualitative Analysis" and Treadwell-Hall's "Qualitative Analysis" for reference. This course should be taken, particularly, by all intending to follow chemistry as a vocation.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor ANDERSON and Mr. KELLY.
Prerequisite, Chemistry 3 or 6.

26. **II.** QUALITATIVE ANALYSIS. — *Acidic.* — Sophomores. A continuation of Course 25. A large part of the term is spent in the examination qualitatively of minerals and of agricultural products.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor ANDERSON and Mr. KELLY.
Prerequisite, Chemistry 25.

27. **III.** QUANTITATIVE ANALYSIS. — For sophomores; juniors and seniors may elect. Instruction in this course includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals. Talbot's "Quantitative Chemical Analysis" is used as a text.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor WELLINGTON, Professor PETERS and Mr. MACNEIL.
Prerequisite, Chemistry 25. Course 26 is prerequisite for those majoring in chemistry.

30. **III.** ORGANIC AGRICULTURAL CHEMISTRY. — For sophomores; juniors and seniors may elect. The course embraces the study of the most important groups of organic compounds of plants and animals, the composition of plants, the chemistry of plant growth, plants as food and as industrial material, the composition of animals, the chemistry of digestion, also the study of some of the products related to plants and animals, such as milk, butter, cheese, sugar, alcohol, wood pulp and paper. The treatment of the subject will be

general, avoiding (so far as possible) complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the general chemistry of plants and animals and agricultural processes and products.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor CHAMBERLAIN and Mr. PERRY.
Prerequisite, Chemistry 3 or 6.

51. **I.** ORGANIC CHEMISTRY. — For juniors; seniors may elect. This course is designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates, proteins, etc. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for future work in agricultural chemical investigation. Those electing Course 51 are expected to elect Course 52.
5 class hours. 2 3-hour laboratory periods, credit, 8.
Professor CHAMBERLAIN and Mr. PERRY.
Prerequisites, Chemistry 3 or 6, and Chemistry 27 for those majoring in chemistry.

52. **II.** ORGANIC CHEMISTRY. — For juniors; seniors may elect. As stated under Course 51.
5 class hours. 2 3-hour laboratory periods, credit, 8.

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Prerequisite, Chemistry 51.

60. **I.** ADVANCED QUANTITATIVE CHEMISTRY. — For juniors; seniors may elect. Advanced work on subjects as stated under Course 27.
1 class hour. 1 4-hour laboratory period, credit, 3.
Professor WELLINGTON, Professor PETERS and Mr. MACNEIL.
Prerequisite, Chemistry 27.

61. **II.** INSECTICIDE ANALYSIS. — For juniors; seniors may elect. A study of methods for the analysis of insecticides. (For 1916–17 only, 2 4-hour laboratory periods, credit 5.)
1 class hour. 1 4-hour laboratory period, credit, 3.
Professor WELLINGTON, Professor PETERS and Mr. MACNEIL.
Prerequisite, Chemistry 27.

62. **III.** SOIL AND FERTILIZER ANALYSES. — For juniors; seniors may elect. A study of methods for analyses of soils and fertilizers.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor WELLINGTON, Professor PETERS and Mr. MACNEIL.
Prerequisite, Chemistry 27.

65. **III.** Physical Chemistry. — For juniors; seniors may elect. A résumé of general chemistry from the viewpoint of physical chemistry, and the application of physical chemistry to agricultural chemistry.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Anderson and Mr. Kelly.
Prerequisite, Chemistry 27.

76. **I.** Milk and Butter Analysis. — For seniors; juniors may elect. A study of chemical methods of analysis of milk and butter.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor Peters and Mr. MacNeil.
Prerequisite, Chemistry 27.

77. **II.** Cattle Feed, Water and Miscellaneous Analysis. — For seniors; juniors may elect. A study of methods of analysis of cattle feeds and water, with interpretations. Other materials may be analyzed.
1 class hour. 1 4-hour laboratory period, credit, 3.
Professor Peters and Mr. MacNeil.
Prerequisite, Chemistry 27.

80. **I.** Physiological Chemistry. — Seniors. This course is intended to be supplementary to Courses 51 and 52, and Course 30. To those who expect to take up scientific work in microbiology, botany, agronomy, animal husbandry, etc., and who have had Courses 51 and 52, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 51 and 52 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion. The course gives additional training in the chemical problems of agricultural experiment-station work, especially those connected with investigations in animal and plant nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Course 30.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Chamberlain and Mr. Perry.
Prerequisites, preferably Chemistry 30 or 51 and 52.

87. **III.** History of Chemistry. — Seniors. An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at greater length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course.
3 class hours. Credit, 3.
Professor Wellington.

90. **II.** Special Work in Agricultural Chemical Analysis. — Seniors. The student is given a problem to solve either in analytical chemistry or related to the agricultural industries. This is to acquaint him with the methods used in research and with the literature, and show him how to handle problems in this field of chemistry when occasion arises.

6 or 10 laboratory hours, credit, 3 or 5.
Professor Peters.

91. **III.** Special Work in Agricultural Chemical Analysis. — Seniors. As stated in Course 90.

10 laboratory hours, credit, 5.
Professor Peters.

Prerequisite, Chemistry 90.

92. **II.** Special Work in Physiological and Organic Agricultural Chemistry. — Seniors. In this course, as in Courses 90 to 94, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, the chemical study of dairy products, etc.

6 or 10 laboratory hours, credit, 3 or 5.
Professor Chamberlain.

Prerequisites, Chemistry 51, 52 and 80.

93. **III.** Special Work in Physiological and Organic Agricultural Chemistry. — Seniors. As stated under Course 92.

10 laboratory hours, credit, 5.
Professor Chamberlain.

Prerequisite, Chemistry 92.

94. **II.** Special Work in Physical Chemistry. — Seniors. The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student will select one line of work and follow it through the course, repeating some of the original work.

6 or 10 laboratory hours, credit, 3 or 5.
Professor Anderson.

Prerequisite, Chemistry 65.

95. **III.** Special Work in Physical Chemistry. — Seniors. As stated under Course 94.

10 laboratory hours, credit, 5.
Professor Anderson.

Prerequisite, Chemistry 94.

## Entomology.

Professor FERNALD, Professor CRAMPTON, Associate Professor GATES, Dr. REGAN.

*Elective Courses.*

26. **II.** 27. **III.** GENERAL AND ECONOMIC ENTOMOLOGY. — For sophomores; juniors and seniors may elect. This is a general course in the study of insects intended for students in any line of work, and is directly continuous through two terms. It touches upon the structure of insects so far as this is needed for such a course; deals with metamorphosis, classification to the larger groups, and discusses the most important methods and materials used for control. The greater part of the time is devoted to special study of the most important insect pests, particularly of New England, showing their modes of life, the injuries they cause, and the best methods of control. In this way the most serious pests of fruit trees, ornamental trees and shrubs, market-garden and greenhouse pests, those attacking field crops and those affecting animals and man, are treated. During the winter term and in the spring term until about the first of May instruction is given by lectures and recitations; from about the first of May field work takes the place of the lectures. In this part of the course the students are shown how to find and recognize the work of the various insect pests which may be accessible at that season of the year, and they also make and preserve a collection of insects.
3 class hours. Credit, 3.
Professor FERNALD.

27. **III.** GENERAL AND ECONOMIC ENTOMOLOGY. — As stated under Course 26. **II.**
2 class hours till about May 1; thereafter 2 2-hour field periods. Credit, 2.
Professor FERNALD, Professor CRAMPTON, Dr. REGAN.

50. **I.** A. PESTS OF SPECIAL CROPS. — For juniors; seniors may elect. For students not majoring in entomology. The laboratory work is largely individual in this term. Accordingly, students majoring in subjects other than entomology, but who desire a more complete knowledge of the insects connected with their own major line of work, can obtain it here. A student majoring in floriculture, for example, will devote his laboratory time to a careful study of the insects injuring floricultural crops, learning how to recognize them and their work in their different stages, and the best methods for their control. Courses of this kind are available on the insects attacking field crops, market-garden crops, tree fruits, small fruits, shade trees and shrubs, flowers, forest trees, the domesticated animals and man. This work may be continued in the winter term also. (See 51., **II.**, A.)

50. **I.** B. INSECT MORPHOLOGY. — For juniors; seniors may elect. For students majoring in entomology. The lectures of this course treat of the external and internal anatomy of insects, particularly of those characters used in identification, a knowledge of which is needed in the accompanying laboratory work. In the laboratory the external anatomy of the most important groups is studied, followed by the identification of insects of these

groups, to show how the characters are made use of in learning the names of insects, and to teach the use of analytical keys.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor CRAMPTON, Professor FERNALD, Dr. REGAN.
Prerequisites, Entomology 26 and 27.

51. **II.** A. PESTS OF SPECIAL CROPS. — As stated in 50, **I.**, A.

51. **II.** B. INSECT CLASSIFICATION. — For juniors; seniors may elect. For students majoring in entomology. Systematic identification of insects of various groups. Study of various entomological publications and methods of finding the literature on any insect.
3 2-hour laboratory periods, credit, 3.
Professor FERNALD, Professor CRAMPTON, Dr. REGAN.
Prerequisite, Entomology 50, **I.**, B.

52. **III.** ECONOMIC ENTOMOLOGY. — For juniors; seniors may elect. Special studies on the most serious insect pests, their habits, nature of the injuries they cause and methods of control. In the lectures the composition, preparation and methods of application of the more important insecticides, their merits and defects, and studies of insecticide apparatus and other methods of control are treated. A portion of the laboratory time will be used in practical work on the topics taken up in the lectures.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor FERNALD, Professor CRAMPTON, Dr. REGAN.
Prerequisite, Entomology 51.

75. **III.** FOREST AND SHADE-TREE INSECTS. — For seniors; juniors may elect. A study of the insects injurious to forest and shade trees, and of methods for their control, with laboratory and field work on these insects, together with investigation of what is known about them.
1 class hour. 3 2-hour laboratory or field periods, credit, 4.
Dr. REGAN.
Prerequisites, Entomology 26 and 27; 50, B, desirable.

76. **I.** ADVANCED ENTOMOLOGY. — For seniors. During this year studies of scale insects (coccidology), life histories of important pests, the preparation of bibliographies, methods of rearing, photography of insects, methods for experimental work and record keeping, and studies of the early stages of insects will be given. Insects as disease carriers, insect bionomics, and a study of the animals not insects with which entomologists are expected to deal, will also be included in this course.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor FERNALD, Professor CRAMPTON, Dr. REGAN.
Prerequisite, Entomology 52.

77. **II.** ADVANCED ENTOMOLOGY. — As stated in Course 76, **I.**
3 2-hour laboratory periods, credit, 3.
Prerequisite, Entomology 76.

78. **III.** Advanced Entomology. — As stated in Course 76, **I.**
1 class hour. 3 2-hour laboratory or field periods, credit, 4.
Prerequisite, Entomology 77.

90. **II.** Evolution. — For juniors; seniors may elect. In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the developmental history of man, and of the races of mankind, the evolution of human intelligence, languages, culture, institutions, etc., and man's probable future in the light of his past development. Especial consideration is given to the factors of evolution, the basic principles of heredity, sex-determination, variation and similar topics, with particular reference to their application to human welfare; and the recent contributions in the field of entomology to the advancement of our knowledge of these fundamental principles are briefly reviewed. The lectures are supplemented by collateral reading, and monthly seminars will be held for the purpose of demonstration and discussion by the class.
3 class hours. Credit, 3.
Professor Crampton.

## Mathematics and Civil Engineering.

Professor Ostrander, Assistant Professor Duncan, Assistant Professor Machmer,
Mr. Hazeltine.

*Required Courses.*

1. **I.** Higher Algebra. — Freshmen. A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra."
5 class hours. Credit, 5.
Assistant Professor Duncan, Assistant Professor Machmer and
Mr. Hazeltine.

2. **II.** Higher Algebra. — As stated under Course 1.
2 class hours. Credit, 2.
Assistant Professor Duncan, Assistant Professor Machmer and
Mr. Hazeltine.

3. **III.** Solid Geometry. — Freshmen. Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Required unless accepted for admission.
3 class hours. Credit, 3.
Assistant Professor Duncan, Assistant Professor Machmer and
Mr. Hazeltine.

5. **II.** Plane Trigonometry (in charge of Department of Physics). — Freshmen. The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry."
3 class hours. Credit, 3.
Professor Hasbrouck and Assistant Professor Robbins.

6. **III.** Mensuration and Computation. — Freshmen. The course includes a review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule. Also the graph, mensuration of plane and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of woodworking; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements.
2 class hours. Credit, 2.
Assistant Professor Machmer, Assistant Professor Duncan and Mr. Hazeltine.

*Elective Courses.*

26. **II.** Plane Surveying. — For sophomores; juniors and seniors may elect. The elements of the subject, including the adjustment and use of the usual instruments. Textbook and lectures.
2 class hours. Credit, 2.
The Department.

27. **III.** Plane Surveying. — For sophomores; juniors and seniors may elect. As stated under Course 26. Includes field work.
3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisite, Mathematics 26.

50. **I.** Analytic Geometry. — For juniors; seniors may elect. A discussion of the geometry of the line, the circle of conic sections and of the higher plane curves. Fine and Thompson's "Co-ordinate Geometry."
3 class hours. Credit, 3.
Assistant Professor Duncan.

Prerequisites, Mathematics 1, 2, 3 and 5.

51. **II.** Differential and Integral Calculus. — For juniors; seniors may elect. A first course in the subject, with some of the more important applications. Davis's "Differential and Integral Calculus."
5 class hours. Credit, 5.
Assistant Professor Duncan.

Prerequisites, Mathematics 1, 2, 3 and 5.

52. **III.** INTEGRAL CALCULUS. — For juniors; seniors may elect. A continuation of Course 51.
5 class hours. Credit, 5.
Assistant Professor DUNCAN.
Prerequisite, Mathematics 51.

53. **II.** ELEMENTARY STRUCTURES. — For juniors; seniors may elect. An elementary course in roofs and bridges. Textbook and lectures.
3 class hours. 1 2-hour laboratory period, credit, 4.
Professor OSTRANDER.

75. **I.** HYDRAULICS AND SANITARY ENGINEERING. — For seniors; juniors may elect. Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Textbook and lectures.
5 class hours. Credit, 5.
Professor OSTRANDER.

76. **I.** MATERIALS OF CONSTRUCTION, FOUNDATIONS AND MASONRY CONSTRUCTION. — For seniors; juniors may elect. Textbook and lectures.
4 class hours. 1 2-hour laboratory period, credit, 5.
Professor OSTRANDER.

77. **II.** ROADS AND RAILROADS. — For seniors; juniors may elect. Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Textbook and lectures.
3 class hours. Credit, 3.
Professor OSTRANDER.

78. **III.** ROADS AND RAILROADS. — For seniors; juniors may elect. As stated under Course 77.
3 2-hour laboratory periods, credit, 3.
Professor OSTRANDER.
Prerequisite, Mathematics 77.

79. **I.** APPLIED MECHANICS. — Seniors. A course in applied mechanics, based on the calculus, with problems. Textbooks and lectures.
5 class hours. Credit, 5.
Professor OSTRANDER.
Prerequisite, Mathematics 51.

## Microbiology.

Professor MARSHALL, Associate Professor VANSUCHTELEN, Dr. ITANO, Mr. RAY.

[Courses 50 and 51 are especially adapted to those who wish a general comprehensive, although elementary, survey of agricultural microbiology.]

### *Elective Courses.*

50. **I. and III.** INTRODUCTION AND GENERAL MICROBIOLOGY. — For juniors; seniors may elect. A review of the field of microbiology as a whole, with special reference to hygienic microbiology, will constitute this course. It

will be taught by means of lectures, demonstrations and textbooks. Although desirable, it will not be required as a prerequisite to all courses that follow, and may be taken along with Course 51.
5 class hours. Credit, 5.
Professor MARSHALL.

51. **I., II. and III.** MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY. — For juniors; seniors may elect. Types of micro-organisms, technic of handling, methods of culture and functions of micro-organisms are considered. This course is elementary and fundamental to all applied and special microbiological studies, and therefore is made a prerequisite to all courses following. One hour will be scheduled.
10 laboratory hours, credit, 5.
Dr. ITANO and Mr. RAY.

52. **III.** ADVANCED MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY. — For juniors; seniors may elect. The purpose of this course is to prepare the student for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technic and methods of culture, together with a more extensive knowledge of micro-organisms and their functions. One hour will be scheduled.
10 laboratory hours, credit, 5.
Dr. ITANO and Mr. RAY.
Prerequisite, Microbiology 51.

75. **II.** AGRICULTURAL MICROBIOLOGY. — For seniors; juniors may elect. This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices. One hour will be scheduled.
10 laboratory hours, credit, 5.
Professor MARSHALL, Associate Professor VANSUCHTELEN, or
Dr. ITANO and Mr. RAY.
Prerequisite, Microbiology 51.

76. **III.** AGRICULTURAL MICROBIOLOGY. — For seniors; juniors may elect. As stated under Course 75. One hour will be scheuled.
10 laboratory hours, credit, 5.
Professor MARSHALL, Associate Professor VANSUCHTELEN, or
Dr. ITANO and Mr. RAY.
Prerequisites, Microbiology 52 and 75.

80. **II.** SOIL MICROBIOLOGY. — For seniors; juniors may elect. Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the

production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention. One hour will be scheduled.

10 laboratory hours, credit, 5.
Associate Professor vanSuchtelen.

Prerequisite, Microbiology 51.

81. I. Hygienic Microbiology. — For seniors; juniors may elect. An attempt will be made to select for this course certain material which should be the possession of every individual, and which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antisepsis and asepsis, will be treated. One hour will be scheduled.

10 laboratory hours, credit, 5.
Professor Marshall and — —, or Dr. Itano and Mr. Ray.

Prerequisites, Microbiology 50 and 51.

82. I. Dairy Microbiology. — For seniors; juniors may elect. Special emphasis will be placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk; bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered.

10 laboratory hours, credit, 5.
Professor Marshall and Mr. ——.

Prerequisites, Microbiology 51, Dairying 51.

83. I. Food Microbiology. — For seniors; juniors may elect. A study of food preservation by means of drying, canning, refrigerating and addition of chemicals will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased foods, will receive consideration. Contamination of food supplies by means of water, handling, exposure, diseased persons, etc., is of especial significance, and will be demonstrated by laboratory exercises. One hour will be scheduled.

10 laboratory hours, credit, 5.
Professor Marshall and Mr. ——.

Prerequisite, Microbiology 51.

## Physics.

Professor Hasbrouck, Assistant Professor Robbins, Mr. Thompson.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

### *Required Courses.*

25. **I.** General Physics. — Sophomores. Mechanics of solids and fluids. This course includes statics, with equilibrium of rigid bodies, work, energy and friction; kinetics, considering rectilinear motion and motion in a curved path; harmonic motion; rotation of rigid bodies, including kinematics of rotation; liquids and gases, with properties of fluids at rest and in motion; properties of matter and its internal forces, including elasticity, capillarity, surface tension.

3 class hours. 1 2-hour laboratory period, credit, 4.

Professor Hasbrouck, Assistant Professor Robbins, Mr. Thompson.

26. **II.** Electricity and Magnetism. — Sophomores. The work in electricity includes such subject-matter as magnetism, electrostatics, electric currents with their production, chemical, heating and mechanical effects; battery cells, measurement of voltage, current flow and resistance, motors and generators.

2 class hours. 1 2-hour laboratory period, credit, 3.

Assistant Professor Robbins and Mr. Thompson.

### *Elective Courses.*

27. **III.** Heat and Light. — For sophomores; juniors and seniors may elect. Thermometry, expansion, colorimetry and specific heat, transmission of heat, changes of state, radiation and absorption. Wave theory of light, optical instruments, analysis of light, color, interference, diffraction, polarization.

4 class hours. 1 2-hour laboratory period, credit, 5.

Professor Hasbrouck, Assistant Professor Robbins and Mr. Thompson.

50. **I.** Electricity, Heat and Light. — For juniors; seniors may elect.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Assistant Professor Robbins.

Prerequisite, Physics 27.

51. **II.** Electricity, Heat and Light. — For juniors; seniors may elect. Continuation of Course 50.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Assistant Professor Robbins.

Prerequisite, Physics 50.

52. **III.** Electricity, Heat and Light. — For juniors; seniors may elect. Continuation of Courses 50 and 51.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Assistant Professor Robbins.

Prerequisite, Physics 51.

### Veterinary Science.

Professor Paige, Associate Professor Gage.

[The courses in veterinary science have been arranged to meet the needs of students who propose following practical agriculture, and of prospective students of human and comparative medicine.]

*Elective Courses.*

50. **I.** Veterinary Hygiene and Stable Sanitation. — For juniors; seniors may elect. This course is intended to familiarize the student with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals.
5 class hours. Credit, 5.
Professor Paige.

51. **II.** General Veterinary Pathology, Materia Medica and Therapeutics. — For juniors; seniors may elect. In this course such fundamental and general pathological conditions are studied as inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in the diagnosis, prevention and treatment of disease. The course in pathology is followed by one in materia medica and therapeutics, dealing with the origin, preparation, pharmacology, pharmacy, administration and therapeutic use of the more common drugs. Poisonous plants and symptoms and treatment of plant poisoning are also considered.
5 class hours. Credit, 5.
Professor Paige.

75. **I.** Comparative (Veterinary) Anatomy. — For seniors; juniors may elect. The anatomy of the horse is studied in detail, and that of other farm animals compared with it where differences exist. This course is essential for those students wishing to elect Course 76.
5 class hours. Credit, 5.
Professor Paige.

76. **II.** Theory and Practice of Veterinary Medicine; General, Special and Operative Surgery. — For seniors; juniors may elect. A course intended to familiarize the student with the various medical and surgical diseases of the different species of farm animals. Particular attention is given to diagnosis and first-aid treatment. The student is taught the technic of simple surgical operations that can with safety be performed by the stock owner. Lectures, demonstrations and practice. This course should be taken in conjunction with Course 51.
5 class hours. Credit, 5.
Professor Paige.

Prerequisite, Veterinary 75.

78. **I.** Essentials of General Pathology. — For seniors; juniors may elect. This course is planned to introduce the student to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis will be considered in the laboratory. The various chemical and biological reactions and tests will be presented from the standpoint of pure science, showing applications of chemistry and biology. The course will serve to liberally educate and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work.

2 3-hour laboratory periods, credit, 3.
Associate Professor Gage.

79. **II.** Essentials of General Animal Pathology. — For seniors; juniors may elect. This is a continuation of Course 78, and is devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease will be considered.

2 3-hour laboratory periods, credit, 3.
Associate Professor Gage.

Prerequisite, Veterinary 78.

80. **III.** Essentials of General Animal Pathology. — For seniors; juniors may elect. As stated in Courses 78 and 79.

2 3-hour laboratory periods, credit, 3.
Associate Professor Gage.

Prerequisite, Veterinary 79.

85. **I.** Avian Pathology. — For seniors; juniors may elect. A course in poultry diseases. The object of this course is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. The work will consist of a systematic study of the diseases of the alimentary tract, liver and abdominal region, followed by a study of the diseases of the respiratory system, circulation and kidneys. The important disease-producing external and internal parasites will be considered; also diseases of the skin and reproductive organs. Lectures and demonstrations.

2 3-hour laboratory periods, credit, 3.
Associate Professor Gage.

86. **II.** Avian Pathology. — For seniors; juniors may elect. As stated under Course 85, also devoted to the study of some of the special diseases of poultry. Recent methods used in the control of these diseases will be considered and opportunity offered the student for demonstrating various disease processes by means of prepared slides. Lectures, demonstrations and laboratory work.

2 3-hour laboratory periods, credit, 3.
Associate Professor Gage.

Prerequisite, Veterinary 85.

87. **III.** Avian Pathology. — For seniors; juniors may elect. As stated under Courses 85 and 86.

2 3-hour laboratory periods, credit, 3.
Associate Professor Gage.

Prerequisite, Veterinary 86.

## Zoölogy and Geology.

Associate Professor Gordon, Dr. Ball.

### ZOÖLOGY.

*Required Courses.*

25. **I.** General Zoloögy. — Sophomores. This course gives an outline of the underlying principles of zoölogy and an introduction to animal structure.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

*Elective Courses.*

27. **III.** Elements of Mammalian Anatomy. — For sophomores; juniors and seniors may elect. This course is offered as a preparation for work in histology, embryology, general vertebrate zoölogy, etc. It also deals briefly with the essentials of physiology. The course is open to prospective students in physiological chemistry, microbiology, animal husbandry, veterinary sciences, etc.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

Prerequisite, Zoölogy 25.

50. **I.** Synoptic Invertebrate Zoölogy. — For juniors; seniors may elect. This course gives a synopsis of the distinguishing characters of the different phyla and classes of invertebrates.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

Prerequisite, Zoölogy 25.

51. **II.** Synoptic Invertebrate Zoölogy. — For juniors; seniors may elect. Continuation of Course 50.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

Prerequisite, Zoölogy 50.

52. **III.** Synoptic Invertebrate Zoölogy. — For juniors; seniors may elect. Continuation of Courses 50 and 51.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Gordon and Dr. Ball.

Prerequisite, Zoölogy 51.

53. **I.** Elements of Microscopic Technique. — For juniors; seniors may elect. This course gives methods of preparing material for microscopic examination.

3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisite, Zoölogy 25.

54. **II.** Elements of Histology. — For juniors; seniors may elect. This course involves preparation and study of normal animal tissues.

3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisites, Zoölogy 27 and 53.

55. **III.** Elements of Histology. — For juniors; seniors may elect. Continuation of Course 54.

3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisite, Zoölogy 54.

75. **I.** Special Zoölogy.[1] — Juniors, seniors, graduates, vocational students and others may ask, and in most cases may arrange, for special work in zoölogy. Such work as is desired in connection with an undergraduate major in another department, or in connection with a vocational course, should be formulated in consultation with officers having the major or vocational course in charge before the request for the work is made. For juniors, seniors and graduates who desire to extend their knowledge of zoölogy along more advanced or special lines, and who are adequately prepared, provision will gladly be made when possible. Work taken under this title may extend through the year, or may be for one term only.

1 class hour. 2 2-hour laboratory periods; hours by arrangement, credit, 3.
The Department.

Prerequisites, each case will be decided by itself.

76. **II.** Special Zoölogy. — As stated under Course 75.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

Prerequisites, each case will be decided by itself.

77. **III.** Special Zoölogy. — As stated under Course 75.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

Prerequisites, each case will be decided by itself.

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[1] Those who desire work in zoölogy as a minor for the degree of master of science or for the degree of doctor of philosophy may elect certain courses offered to juniors or seniors, or may arrange for separate work. The graduate student who elects undergraduate courses must meet the requirements of the graduate standards of work and accomplishment.

## GEOLOGY.

### *Required Courses.*

2. **II.** AGRICULTURAL GEOLOGY. — Freshmen. The elements of geology in their application to agriculture.
2 class hours. Credit, 2.
Associate Professor GORDON.

### *Elective Courses.*

27. **III.** GENERAL GEOLOGY. — For sophomores; juniors and seniors may elect. Rock-forming minerals; rock types; rock weathering; dynamical, structural and surface geology. Lectures, map and field work.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Associate Professor GORDON.

## DIVISION OF THE HUMANITIES.

Professor SPRAGUE.

### Economics and Sociology.

Professor SPRAGUE.

[The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.]

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

*Elective Courses.*

26. **II.** CIVILIZATIONS, ANCIENT AND MODERN. — For sophomores; others may elect. This course studies the evolutionary origin and history of man; characteristics of primitive man, departure from the animal status and beginnings of civilization; origin and development of industries, arts and sciences; the evolution of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern development; characteristic features of the leading civilizations and races of ancient and modern times; beneficial and dangerous factors in American life in view of the history of human civilization.
5 class hours. Credit, 5.
Professor SPRAGUE.

50. **I.** BUSINESS AND INDUSTRY. — For juniors and seniors. The forms, organization, administration and labor problems of business. This course is devoted to the following subjects: methods of organizing, financing and administering corporations and partnerships; forms of business administration, wholesaling, jobbing, retailing, advertising, credits and collections; systems of industrial remuneration for wage earners, co-operation and preserving industrial peace; problems concerned with protective legislation for workmen and employers, sweated industries, prison labor, child labor and industrial education.
5 class hours. Credit, 5.
Professor SPRAGUE.

51. **II.** INTRODUCTION TO ECONOMIC PRINCIPLES AND PROBLEMS. — For juniors. This course is devoted to the study of the following subjects: definitions of economic terms, such as wealth, capital, value, etc.; factors of production, exchange and consumption; principles of economic production, supply and demand, diminishing returns, division of labor, productive organization, concentration of capital and labor, trust and monopoly problems, public control of production and distribution; principles of exchange, theories of value, money and its problems; international trade, tariff and free trade theories, American merchant marine, reciprocity, and trade treaties; forms of income, wages, interest, rent, profits and the forces which govern them; principles of spending, economy, luxury, conservation of individual and national resources; principles and agencies for saving, investments, banks, building associations,

insurance of all kinds; schemes for social organization; socialism, communism, industrial democracy. Textbook and readings.
5 class hours. Credit, 5.
Professor SPRAGUE.

75. **I.** SOCIAL INSTITUTIONS AND SOCIAL REFORMS. — For seniors; juniors by permission. This course is devoted to the study of the social institutions, such as the family, the State, property, religions; and to such current problems as eugenics, race suicide, divorce, crime and delinquent classes, prison reform, prevention and treatment of dependents and defectives, poverty, its causes and preventions; constructive modern social reform movements for insurance of wage earners, protection of childhood, assurance of safety, health and play time for all classes. The correctional and charitable institutions of Massachusetts will be studied in considerable detail.
5 class hours. Credit, 5.
Professor SPRAGUE.

77. **III.** PUBLIC FINANCE, TAXATION, MONEY AND BANKING. — For seniors. This course studies systems and problems of taxation as they are found in Europe and America; objects for spending public revenue; public debts and methods of organizing them; systems of money and currency problems of America; types, methods and functions of banks; economic and financial crises and depressions in the United States; modern war finance. Readings and lectures.
5 class hours. Credit, 5.
Professor SPRAGUE.

## History and Government.

*Elective Courses.*

50. **III.** GOVERNMENT. — For juniors; seniors may elect. This course will cover subjects as follows: forms and working methods of the governments of Great Britain, Germany, France, Russia, Switzerland, New Zealand and Canada; historic types and theories of government; forms and methods of Federal, State and local governments in America; progress and problems of democracy and new reform movements in organization and administration; new tendencies towards social legislation and extension of governmental control over broader interests of the people.
5 class hours. Credit, 5.
Professor SPRAGUE.

75. **II.** HISTORY OF NEW ENGLAND. — For seniors; juniors may elect. Treating New England as a geographical and political unit, this course aims to give a survey of its religious, social, economic and political history. The development of its institutions, the growth of its industries, the spread of its population to other sections of the country, its influence upon national character and politics are phases of the subject which will be discussed. Assigned readings and theses will be required.
3 class hours. Credits, 3.
Miss JEFFERSON.

## Languages and Literature.

Professor LEWIS, Associate Professor NEAL, Associate Professor ASHLEY, Associate Professor MACKIMMIE, Assistant Professor PRINCE, Assistant Professor PATTERSON, Miss GOESSMANN, Mr. HARMOUNT, Mr. JULIAN, Mr. RAND, Mr. PAYNE.

### ENGLISH.

*Required Courses.*

1. **I.** 2. **II.** 3. **III.** ENGLISH. — Freshmen. Composition. Intended to teach straight thinking, sound structure, clear and correct expression. Lectures, recitations, theme writing and conferences. Textbooks: Canby and others, "English Composition in Theory and Practice;" Woolley's "Handbook of Composition."

3 class hours each term. Credit, 3 each term.

Assistant Professor PRINCE, Assistant Professor PATTERSON, Mr. RAND and Mr. PAYNE.

25. **I.** 26. **II.** 27. **III.** ENGLISH. — Sophomores. A general reading course in English literature. Two class hours each term. Credit, 2 each term.

Professor LEWIS and Miss GOESSMANN.

*Elective Courses in English Language and Literature.*

[The elective courses in English fall into two groups. Both groups are intended to increase the student's appreciation of literature as a means to enjoyment, education and spiritual growth. Group one (Courses 50, 51, 52, 53, 54 and 55) will, besides introducing the student to individual writers, emphasize the life and thought of the times, political, economic and social, in order that the student may realize literature a the expression of individual genius representing (by leading it or summarizing it) the thought and spirit of a period or a social unit. Group two (Courses 75, 77, 79 and 80) will tend more to emphasize form-characteristics, artistic quality or historical development of literary types, or individual great writers. Courses 50, 51, 55, 75, 79 and 80 are offered in 1916-17; Courses 52, 53, 54, 55, 77 and 80 are offered in 1915-16 and 1917-18.]

50. **I.** ENGLISH WRITERS AND THOUGHT. — *Verse from* 1744 *to* 1832 (1916, 1918). — Alternates with Course 53 for juniors; seniors may elect. A course in history, appreciation and understanding. Some of the writers studied are Gray, Goldsmith, Burns, Coleridge, Wordsworth, Keats, Shelley, Scott and Byron.

3 class hours. Credit, 3.

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51. **II.** ENGLISH WRITERS AND THOUGHT. — Alternates with Course 54. *Nineteenth Century Verse* (1915, 1917). — Juniors; seniors may elect. In general conception this course is like Course 50. Tennyson, Browning, Mrs. Browning, Arnold, the Rossettis and Morris, Swinburne and Clough are the authors to be studied.

3 class hours. Credit, 3.

Professor LEWIS.

57. **III.** ENGLISH WRITERS AND THOUGHT. — For juniors; seniors may elect. As stated under Course 51.

2 class hours. Credit, 2.

Professor LEWIS.

Prerequisite, English 51.

52. **III.** English Writers and Thought. — *From Milton to Pope* (1915–17). — For juniors; seniors may elect. A survey course that will emphasize the leading writers of the periods, including Bacon, Milton, Dryden, Addison and the essayists, Swift and Pope. Given every second year.
3 class hours. Credit, 3.

53. **I.** English Writers and Thought. — Alternating with Course 50. *Prose from* 1744 *to* 1832 (1915, 1917). — For juniors; seniors may elect. A course in English prose paralleling Course 51. Some of the writers studied are Johnson, Sterne, Goldsmith, Burke, Miss Burney, Coleridge, Landor, Lamb, DeQuincey and Hazlitt.
3 class hours. Credit, 3.

54. **III.** English Writers and Thought. — Alternating with Course 51. *Nineteenth Century Prose* (1916, 1918). — For juniors; seniors may elect. This course parallels Course 51. Among the writers discussed will be Macaulay, Carlyle, Ruskin, Newman and Arnold.
3 class hours. Credit, 3.
Professor Lewis.

58. **III.** English Writers and Thought. — For juniors; seniors may elect. As stated under Course 54.
2 class hours. Credit, 2.
Professor Lewis.

Prerequisite, English 54.

55. **II.** American Writers and Thought. — For juniors; seniors may elect. Intended to give a general survey of literature in America, especially in the nineteenth century, with an introduction to the work of the best known writers, and with especial attention to the relations between national life and history and national thought as expressed in literature. The usual authors — Irving, Cooper, Bryant, Poe, Longfellow, Emerson, Hawthorne, Whittier, Parkman, Lowell, Holmes, Whitman, Lanier — will be discussed, and attention will be given to southern and western authors. Present writers and tendencies will also receive some notice.
3 class hours. Credit, 3.
Assistant Professor Prince.

56. **III.** American Writers and Thought. — For juniors; seniors may elect. As stated under Course 55.
2 class hours. Credit, 2.
Assistant Professor Prince.

Prerequisite, English 55.

60. **I.** The Literature of Rural Life. — For juniors; seniors may elect. A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pur-

suits, together with those who have upheld as an ideal the development of a rural environment in cities.
3 class hours. Credit, 3.
Miss GOESSMANN.

61. **II.** THE LITERATURE OF RURAL LIFE. — For juniors; seniors may elect. As stated under Course 60.
2 class hours. Credit, 2.
Miss GOESSMANN.

Prerequisite, English 60.

75. **III.** PROSE FICTION. — Alternating with Course 77. *The Novel* (1916, 1918). — For seniors; juniors may elect. Readings, references, reports and classroom talks. The course is mainly informal. [Withheld 1916.]
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor NEAL.

77. **III.** PROSE FICTION. — Alternating with Course 75. *The Short Story* (1915, 1917). — For seniors; juniors may elect. Readings, references, reports and classroom talks. The course is mainly informal. General texts, Neal's "Short Stories in the Making" and "To-day's Short Stories Analyzed."
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor NEAL.

79. **II.** THE DRAMA. — For seniors; juniors may elect. A cursory survey of early English drama, its origin, forms and meaning, will be followed by a careful study of Shakespeare. Four of his plays will be analyzed in detail, and many others will be read and discussed.
3 class hours. Credit, 3.
Mr. RAND.

80. **III.** THE DRAMA. — For seniors; juniors may elect. The course will trace the development of modern drama, especial attention being given to plays by Congreve, Goldsmith, Sheridan, Robertson, Jones, Pinero, Fitch, Shaw, Moody and Ibsen.
2 class hours. Credit, 2.
Mr. RAND.

Prerequisite, English 79.

### RURAL JOURNALISM.

[The courses in journalism emphasize rural journalism. They aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant the application of journalistic principles in getting and suitably presenting material adapted to the nonurban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. As practical work, members of the classes supply "The Bay State Ruralist," a feature page for the "Springfield Union," and the "New Bedford Standard." Cordial unofficial relations are maintained with the college paper, "The Massachusetts Collegian."]

### *Elective Courses.*

50. **I.** FOUNDATIONS OF WRITING: EXPOSITION. — For juniors; seniors may elect. Advanced composition; planning expository thought; expository structure; specimens, including contemporary articles from farm and rural

life publications; some bulletin writing, including presentation of technical information for nontechnical readers.
3 class hours. Credit, 3.
Associate Professor Neal.

51. **II.** Foundations of Writing: Narration and Description. — For juniors; seniors may elect. The fundamental elements of style, word-choice, diction, sentence form and paragraph types. Description of persons, places, objects, industries and productional processes, the temper and characteristic aspects of public gatherings, moods, behavior and character-sketching. Narration of incident, sustained action, events in series and the like, as in biography, dramatic situation, history and fiction.
3 class hours. Credit, 3.
Associate Professor Neal, Mr. Rand.

52. **III.** Foundations of Writing: Magazine Writing. — For seniors; juniors may elect. Study and writing of various forms of magazine and similar articles.
3 class hours or equivalent in laboratory. Credit, 3.
Associate Professor Neal.
Prerequisite, one or more junior courses in journalism, or experience on college publications.

53. **I.** News-gathering and News-writing. — For juniors; seniors may elect. The foundation aims and conceptions of journalism. Readings, lectures, quizzes and personal conferences; reporting on runs and on assignment; regular reading of a daily paper and of a weekly review or farm journal, with reports. Central purpose, to develop ability to pick out essentials from inessentials, perceive elements of interest, and present facts with appeal to the reader. This course and Courses 54 and 55 are suited to non-majoring students whose vocation will require the popular presentation of technical or other information; *e.g.*, extension workers, county agents, agricultural school instructors, experiment-station editors, survey and other social service workers, men engaged in sociological or economic investigations, landscape architects and civil and sanitary engineers.
6 laboratory hours, credit, 3.
Associate Professor Neal.

54. **II.** News-gathering and News-writing. — For juniors; seniors may elect. As outlined under Course 53, except that students who have taken Course 53 will be assigned different readings, and may be given a larger amount of reporting or other writing.
6 laboratory hours, credit, 3.
Associate Professor Neal.

55. **III.** News-gathering and News-writing. — For juniors; seniors may elect. As stated under Courses 53 and 54.
6 laboratory hours, credit, 3.
Associate Professor Neal.

77. **I.** Editorial, Materials and Methods. — For seniors; juniors may elect. Readings, quizzes, reports and personal conferences; regular reading of one daily paper and one weekly review or rural life periodical; writing of editorial articles; current events or history. Recommended to nonmajoring students who desire practice in discovering the significant aspects of matters of public attention and in effectively expressing comment thereon.
6 laboratory hours, credit, 3.
Associate Professor Neal.

78. **II.** Editorial Materials and Methods. — For seniors; juniors may elect. As stated under Course 77.
6 laboratory hours, credit, 3.
Associate Professor Neal.

79. **III.** Editorial Materials and Methods. — For seniors; juniors may elect. As stated under Course 77.
6 laboratory hours, credit, 3.
Associate Professor Neal.

80. **I.** Advanced Journalistic Practice. — Seniors. Preparation, editing and publication of a rural life page or periodical.
8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

81. **II.** Advanced Journalistic Practice. — Seniors. As stated under Course 80.
8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

82. **III.** Advanced Journalistic Practice. — Seniors. As stated under Course 80.
8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

## Public Speaking.

### *Required Courses.*

1. **I.** 2. **II.** 3. **III.** Public Speaking. — Freshmen. Freshmen public speaking is required in the first, second or third term, at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Much attention, therefore, is given to the preparation and delivery of extempore speeches. Textbook, Robinson's "Effective Public Speaking," supplemented by class work and discussions. First, second or third terms, as directed.
1 class hour. Credit, 1.
Assistant Professor Prince, Assistant Professor Patterson, Mr. Rand.

### *Elective Courses.*

50. **I.** Argumentation. — For juniors; seniors may elect. The course aims to present the fundamental principles of argumentation as applied to oral and written discourse, and intends to develop in the student power to

handle argument convincingly and persuasively. Lectures, discussions of leading questions of the day, practice in brief-drawing and the writing of forensics. Textbook, Foster's "Argumentation and Debating." The course is recommended for those who desire to enter the intercollegiate debates.
3 class hours. Credit, 3.
Assistant Professor PRINCE.

Prerequisite, Public Speaking 1, 2 or 3.

51. **II.** OCCASIONAL ORATORY. — For juniors; seniors may elect. The course involves a study of the elements of vocal expression and action; speeches on assigned subjects; prescribed reading; the preparation and delivery of several formal orations. Textbook, Shurter's "The Rhetoric of Oratory." The course is recommended for those who wish to enter the Flint contest.
3 class hours. Credit, 3.
Assistant Professor PRINCE.

Prerequisite, Public Speaking 1, 2 or 3.

## French and Spanish.

Associate Professor MACKIMMIE, Mr. HARMOUNT.

### FRENCH.

*Required Courses.*

1. **I.** 2. **II.** 3. **III.** ELEMENTARY FRENCH. — Freshmen; open upon arrangement to other students. The essentials of grammar are rapidly taught and will be accompanied by as much reading as possible. This course is required of freshmen presenting German for entrance who do not continue that language and have not studied French.
3 class hours each term. Credit, 3 each term.
Mr. HARMOUNT.

4. **I.** 5. **II.** 6. **III.** INTERMEDIATE FRENCH. — Freshmen; open upon arrangement to other students. Training for rapid reading. The reading of a number of short stories, novels and plays; composition, reports on collateral reading from periodicals and scientific texts in the library.
3 class hours each term. Credit, 3 each term.
Associate Professor MACKIMMIE, Mr. HARMOUNT.

Prerequisite, required of freshmen who present two years of French for entrance and do not take German.

*Elective Courses.*

25. **I.** INTERMEDIATE FRENCH. — For sophomores; open upon arrangement to other students. Training for rapid reading; the reading of a number of short stories, novels and plays; readings from periodicals and scientific texts in the library.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.

Prerequisites, French 1, 2 and 3.

26. **II.** Intermediate French. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, French 25.

27. **III.** Intermediate French. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, French 26.

28. **I.** Advanced French. — For sophomores; open upon arrangement to other students. A reading course. Balzac's "Eugénie Grandet" and "Le Père Goriot," and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports.
3 class hours. Credit, 3.
Mr. Harmount.

Prerequisites, French 4, 5 and 6.

29. **II.** Advanced French. — For sophomores; open upon arrangement to other students. As stated under Course 28.
3 class hours. Credit, 3.
Mr. Harmount.

Prerequisites, French 4, 5 and 6.

30. **III.** Advanced French. — For sophomores; open upon arrangement to other students. General view of the history of French literature; Kastner and Atkins' "History of French Literature." Representative works of the important periods will be studied in class. Outside reading will be required.
3 class hours. Credit, 3.
Mr. Harmount.

Prerequisites, French 25 and 26, or French 28 and 29.

50. **I.** Scientific French. — For juniors; seniors may elect. This course is planned to meet the requirements of the individual student, and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required, and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read.
3 class hours. Credit, 3.
Mr. Harmount.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

51. **II.** Scientific French. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Mr. Harmount.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

52. **III.** SCIENTIFIC FRENCH. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Mr. HARMOUNT.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

75. **I.** FRENCH LITERATURE. — For seniors; juniors may elect. The object of Courses 75, 76 and 77 is to give an introduction to recent movements in French literature. Course 75 will deal with the drama, and plays by Augier, A. Dumas, fils, Delavigne and some contemporary dramatists will be read and studied.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

76. **II.** FRENCH LITERATURE. — For seniors; juniors may elect. This course deals with the novel. Works by Flaubert, the De Goncourts and Zola will be read. Written reports are required on outside reading.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

77. **III.** FRENCH LITERATURE. — For seniors; juniors may elect. Modern criticism. Sainte-Beuve, "Causeries de Lundi" (Harper) and works by Taine and Renan. Reference book, Lanson's "Histoire de la Litterature Française."
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

### SPANISH.

*Elective Courses.*

50. **I.** ELEMENTARY SPANISH. — For juniors; seniors may elect. Open to other students upon arrangement. Grammar, with special drill in pronunciation; exercises in conversation and composition. Reading from a reader and selected short stories.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.

51. **II.** ELEMENTARY SPANISH. — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 50.

52. **III.** ELEMENTARY SPANISH. — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 51.

75. **I.** MODERN SPANISH AUTHORS. — Seniors. Reading from modern Spanish novel and drama. Translation of English into Spanish. Private reading.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 52.

76. **II.** MODERN SPANISH AUTHORS. — Seniors. As stated in Course 75.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 75.

77. **III.** MODERN SPANISH AUTHORS. — Seniors. As stated in Course 75.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 76.

## German and Music.

Associate Professor ASHLEY, Mr. JULIAN.

### GERMAN.

*Required Courses.*

1. **I.** 2. **II.** 3. **III.** ELEMENTARY GERMAN. — Freshmen; open upon arrangement to other students. Grammar composition and reading. Especial attention is given to oral work in German and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German.
3 class hours, each term. Credit, 3 each term.
Associate Professor ASHLEY and Mr. JULIAN.

4. **I.** 5. **II.** 6. **III.** INTERMEDIATE GERMAN. — Freshmen; open upon arrangement to other students. Selected works of Schiller, Heine and Goethe. Grammar review and advanced prose composition.
3 class hours each term. Credit, 3 each term.
Associate Professor ASHLEY.
Prerequisite, required of freshmen who present two years of German for entrance and do not take French.

*Elective Courses.*

25. **I.** INTERMEDIATE GERMAN. — For sophomores; open upon arrangement to other students. Reading of such works as Sudermann's "Frau Sorge," "Wilhelm Tell," "Die Journalisten," etc. Grammar review.
3 class hours. Credit, 3.
Mr. JULIAN.
Prerequisites, German 1, 2 and 3.

26. **II.** INTERMEDIATE GERMAN. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Mr. JULIAN.
Prerequisite, German 25.

27. **III.** Intermediate German. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisite, German 26.

28. **I.** Advanced German. — For sophomores; open upon arrangement to other students. Reading and studying of Goethe's most important literature productions.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisites, German 4, 5 and 6.

29. **II.** Advanced German. — For sophomores; open upon arrangement to other students. Development of the German novel; rapid reading of great novelists.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 28.

30. **III.** Advanced German. — For sophomores; open upon arrangement to other students. As stated under Course 29.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 29.

*Elective Courses.*

50. **I.** Scientific German. — For juniors; seniors may elect. Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

51. **II.** Scientific German. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 50.

52. **III.** Scientific German. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 51.

75. **I.** German Literature. — Seniors. Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust" and one modern typical drama.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisites, German 28, 29 and 30.

76. **II.** German Literature. — Seniors. As stated under Course 75.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisite, German 75.

77. **III.** German Literature. — Seniors. As stated under Course 75.
3 class hours. Credit, 3.
Associate Professor Ashley.
Prerequisite, German 76.

78. **I.** Conversation and Composition. — For seniors; juniors may elect. Translating connected English into German. Reproducing outside readings in German orally in class.
1 class hour. Credit, 1.
Associate Professor Ashley.
Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

79. **II.** Conversation and Composition. — For seniors; juniors may elect. As stated under Course 78.
1 class hour. Credit, 1.
Associate Professor Ashley.
Prerequisite, German 78.

80. **III.** Conversation and Composition. — For seniors; juniors may elect. As stated under Course 78.
1 class hour. Credit, 1.
Associate Professor Ashley.
Prerequisite, German 79.

## Music.

### *Elective Courses.*

50. **I.** History and Interpretation of Music. — For juniors; seniors may elect. History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school, — Bach, Händel, Haydn, Gluck and Mozart.
1 class hour. Credit, 1.
Associate Professor Ashley.

51. **II.** History and Interpretation of Music. — For juniors; seniors may elect. A continuation of Course 50. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera.
1 class hour. Credit, 1.
Associate Professor Ashley.

52. **III.** History and Interpretation of Music. — For juniors; seniors may elect. The Modern school and Modern composers.
1 class hour. Credit, 1.
Associate Professor Ashley.

## DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

### Agricultural Economics.

Professor Cance and Mr. Rutledge.

*Required Course.*

26. **II.** Agricultural Industry and Resources. — Sophomores. A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions.
5 class hours. Credit, 5.
Professor Cance, Mr. Rutledge.

*Elective Courses.*

50. **I.** Elements of Agricultural Economics. — For juniors; seniors may elect. This course is designed to follow the required work in the elements of economics. It deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; principles of rural credit; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work.
5 class hours. Credit, 5.
Professor Cance.

51. **I.** Historical and Comparative Agriculture. — For juniors; seniors may elect. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Students in education and rural journalism should find this course helpful.
5 class hours. Credit, 5.
Mr. Rutledge.

52. **II.** Co-operation in Agriculture. — For juniors; seniors may elect. The course treats of the history, principles and business relations of agri-

cultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements; (2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, with particular reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises.
5 class hours. Credit, 5.
Professor CANCE.

75. **I.** THE AGRICULTURAL MARKET. — For seniors and graduate students; juniors may elect. A study of the forces and conditions which determine the prices of farm products and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market and direct sales are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work.
5 class hours. Credit, 5,
Professor CANCE.

76. **II.** TRANSPORTATION OF AGRICULTURAL PRODUCTS. — For seniors and graduate students; juniors may elect. This course deals with transportation in the United States, covering highways, waterways, railways and electric ways, with reference to the facilities for and cost of transporting farm products, opening up new agricultural areas or industries, and contributing to the wealth and welfare of the agricultural population. Lectures, text and field work.
5 class hours. Credit, 5.
Professor CANCE.

77. **III.** PROBLEMS IN AGRICULTURAL ECONOMICS. — For seniors and graduate students; juniors may elect. An advanced course for students desirous of studying more intensively some of the economic problems affecting the farmer. Some of these are: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems, — cost of producing farm products, farm labor in New England, immigration, agricultural credit. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest.
5 class hours. Credit, 5.
Professor CANCE.

80. **I.** SEMINAR. — For seniors and graduate students. Research in agricultural economics and history; problems of New England agriculture. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged.
1 2-hour laboratory period, credit, 1.
The DEPARTMENT.

81. **II.** SEMINAR. — For seniors and graduate students. As stated in Course 80.

1 2-hour laboratory period, credit, 1.
The DEPARTMENT.

82. **III.** SEMINAR. — For seniors and graduate students. As stated in Course 80.

1 2-hour laboratory period, credit, 1.
The DEPARTMENT.

## Agricultural Education.

Professor HART.

*Elective Courses.*

50. **I.** MEANING OF EDUCATION (PSYCHOLOGY). — For juniors; seniors may elect. For teachers and others desiring an introduction to mental science. A study of the development, structure and functions of the nervous system and. the sense organs; the development and nature of mental activities; the nature of the learning processes.

5 class hours. Credit, 5.
Professor HART.

51. **II.** RURAL SCHOOL PROBLEMS. — For juniors; seniors may elect. Primarily for teachers. A study of agricultural education; the theory and practice of teaching; rural school organization; methods of instruction; the place and function of agriculture in the course of study for both rural and city schools; planning and practical work in school and home gardens; planning of equipment and ornamentation of rural school grounds.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor HART.

52. **IV.** RURAL SCHOOL PROBLEMS. — For juniors; seniors may elect. As stated under Course 51.

120 laboratory hours, credit, 5.
Professor HART.

53. **III.** HISTORY AND PHILOSOPHY OF EDUCATION. — For juniors; seniors may elect. For teachers and others desiring an introduction to educational theories. A study of educational ideals and movements as exemplified by leading nations and races; the growth of educational institutions as influenced by science and industry; the history and meaning of industrial and agricultural education.

5 class hours. Credit, 5.
Professor HART.

75. **I.** PROBLEMS IN RURAL EDUCATION. — For seniors. For teachers or others interested in special phases of education, such as child development, physical and mental; school organization; rural schools; secondary schools; school programs; grading and promotion of pupils; school grounds and school

architecture and equipment; normal schools and the preparation of teachers; agricultural teaching and agricultural schools.
4 class hours. Credit, 4.
Professor HART.

76. **II.** PROBLEMS IN RURAL EDUCATION. — Seniors. As stated under Course 75.
4 class hours. Credit, 4.
Professor HART.

77. **II.** EXTENSION AND COUNTY AGENT WORK. — For seniors. The course consists chiefly of library research work. Each student will be required to produce one or more complete lectures under guidance both as to method of preparation and subject-matter, and one or more demonstrations. These lectures will be presented to public audiences in the presence of a board of critics. Some instruction will be given in organization and administration of the Extension Service. The Extension Service will be responsible for the public presentation and criticism. The student's major adviser will be responsible for the accuracy of the subject-matter. The Department of Agricultural Education will be responsible for the preparation of the lectures.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor HART.

78. **III.** EXTENSION AND COUNTY AGENT WORK. — For seniors. As stated under Course 77.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor HART.

## Rural Sociology.

Professor PHELAN, President BUTTERFIELD, Professor HART, Mr. NOVITSKI.

*Required Course.*

27. **III.** ELEMENTS OF RURAL SOCIOLOGY. — Sophomores. A broad survey of the field of rural sociology, including such topics as the origin of rural sociology, its methods and problems; relation of sociological to the scientific and technical aspects of agricultural problems; the development of the rural community in New England and the west, religious, educational and social ideals of rural people; characteristics and influence of the rural environment, the movement of the rural population, the effects of immigration; rural institutions, the school, the church, local government, effects of modern conditions of life on rural institutions; rural organization; problems of progress, an analysis of the needs of rural life in its further development. Lectures, readings and essays on assigned topics.
3 class hours. Credit, 3.
Professor PHELAN, Mr. NOVITSKI.

*Elective Courses.*

50. **I.** SOCIAL CONDITION OF RURAL PEOPLE. — For juniors; seniors may elect. A. The rural status: composition of the rural population, nature, extent and causes of diseases and accidents, health agencies of control; extent

and causes of rural delinquency and dependency, conditions of temperance of sexual morality and family integrity; child labor, women's work and position; standard of living, size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics.

B. Rural social psychology: characteristics of the rural mind, character of hereditary and environmental influence; nature and effect of face-to-face groups; fashion, conventionality, custom, character of discussion and of public opinion.

3 class hours. Credit, 3.

Professor PHELAN.

51. **II.** RURAL GOVERNMENT. — For juniors; seniors may elect. A general survey of the development of rural government in the United States; origin of the New England town, its influence upon the west, advantages, development of efficiency, county government, the influence of the farmer in legislation, good roads movement, credit, facilities, taxation, boards of agriculture, agricultural colleges and experiment stations in relation to rural welfare; national government; a general survey of political organizations and movements among farmers in the United States and foreign countries and their influence in shaping legislation; relation of the Department of Agriculture, postal system, the various national commissions and agencies to rural welfare. Lectures, readings, written exercises on assigned topics.

3 class hours. Credit, 3.

Professor PHELAN, Mr. NOVITSKI.

52. **III.** RURAL ORGANIZATION. — For juniors; seniors may elect. A study of the organized agencies by which rural communities carry on their various forms of associated life, particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment; principles underlying leadership, qualifications of the paid leader and the lay leader; the field of rural social service, national, State and local, preparation and opportunity for service; rural community building, a study of organized ways and means by which aid is given local communities.

3 class hours. Credit, 3.

President BUTTERFIELD.

75. **I. and III.** FARMERS' ORGANIZATIONS. — For seniors; juniors may elect. The history, purposes and achievements of the grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; the method, scope and history of local, State and national associations formed about some farm product, their influence in forming class consciousness and in shaping agrarian legislation; need of federation. Lectures, readings and essays on assigned topics.

3 class hours. Credit, 3.

Professor PHELAN.

76. **I.** FIELD WORK IN RURAL SOCIOLOGY. — For seniors; juniors may elect. This course is designed to meet the needs of students who wish to do some constructive work in rural social service while still in college. The work will be carried on in co-operation with the various college agencies engaged in

rural service. Any project for which credit in this course is to be asked must first have the approval of the head of the department.

From 2 to 6 laboratory hours, credits, 1 to 3.
Professor PHELAN.

Prerequisites, Rural Sociology 27 and 52.

77. **II.** RURAL SOCIAL SURVEYS. — For seniors; juniors may elect. A careful study of the theory and function of statistics, the limitations and difficulties in the use of statistics, the interpretation of statistical data, various methods of graphic representation; a study of surveys, kinds and use, method of gaining information, the basis for conclusions, value of information gained. Text and lectures.

3 class hours. Credit, 3.
Professor PHELAN.

78. **II.** RURAL AND BUSINESS LAW. — For seniors; juniors may elect. The work of this course will cover such points as land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures and class discussions.

5 class hours. Credit, 5.
Professor HART.

79. **I.** SEMINAR. — Credits, 1 to 3. Professor PHELAN.

80. **II.** SEMINAR. — Credits, 1 to 3. Professor PHELAN.

81. **III.** SEMINAR. — Credits, 1 to 3. Professor PHELAN.

## GENERAL DEPARTMENTS.

### Military Science and Tactics.

Capt. H. W. Fleet, Infantry, U. S. A.; Adjutant: Ordnance Sergeant J. J. Lee, U. S. A., retired; Assistant: Quartermaster Sergeant Alex. Smart, U. S. A., retired.

[Owing to the approaching establishment of the Reserve Officers Training Corps, a revision of the statement of work in this department is necessary. It will appear in the spring supplement. The present statement is effective for the college year 1916-17.

The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-year course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical courses (drill) in military science are given in the first and third terms; the corresponding courses in physical education in the second term.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

The required uniform is of olive drab cloth, costing about $17. It is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $17 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74 inclusive, juniors; 75 to 99, inclusive, seniors.]

*Required Courses.*

1. **I.** Tactics. — Freshmen. Theoretical instruction in infantry drill regulations through the battalion and ceremonies. Lectures on military subjects and military history.
1 class hour. Credit, 1.
Captain Fleet.

3. **III.** Tactics. — Freshmen. As stated under Course 1.
1 class hour. Credit, 1.
Captain Fleet.

4. **I.** Drill. — Freshmen. Practical instruction in infantry drill regulations through the battalion. Ceremonies.

3 laboratory hours, credit, 1.
Captain Fleet.

6. **III.** Drill. — Freshmen. As stated under Course 4. Company training in bayonet exercises and physical exercises with and without arms.

3 laboratory hours, credit, 1.
Captain Fleet.

25. **I.** Tactics. — Sophomores. Theoretical instruction in map problems in security and information. Combat. Lectures on military subjects and military history.

1 class hour. Credit, 1.
Captain Fleet.

27. **III.** Tactics. — Sophomores. As stated under Course 25.

1 class hour. Credit, 1.
Captain Fleet.

28. **I.** Drill. — Sophomores. Practical instruction in field service regulations in the service of security and information. Corporals are appointed from this class.

3 laboratory hours, credit, 1.
Captain Fleet.

30. **III.** Drill. — Sophomores. As stated under Course 28; intrenching, combat.

3 laboratory hours, credit, 1.
Captain Fleet.

50. **I.** Military Science. — Juniors. Theoretical instruction in the small-arms firing regulations, in fire discipline, fire control and fire direction.

1 class hour. Credit, 1.
Captain Fleet.

52. **III.** Military Science. — Juniors. As stated in Course 50.

1 class hour. Credit, 1.
Captain Fleet.

53. **I.** Drill. — Juniors. Practical instruction in the small-arms firing regulations in target practice, estimating distances and field firing. Lieutenants and sergeants are appointed from this class.

3 laboratory hours, credit, 1.
Captain Fleet.

55. **III.** Drill. — Juniors. As stated under Course 53.

3 laboratory hours, credit, 1.
Captain Fleet.

*Elective Courses.*

75. **I.** MILITARY SCIENCE. — Seniors. Theoretical instruction in infantry drill regulations, field service regulations, and small-arms firing regulations for company, battalion and regiment.
1 class hour. Credit, 1.
Captain FLEET.

77. **III.** MILITARY SCIENCE. — Seniors. As stated under Course 75.
1 class hour. Credit, 1.
Captain FLEET.

78. **I.** DRILL. — Seniors. Conduct drills of lower classes. Field officers and captains are appointed from this class. These officers are paid. The positions in every case are obtained by competition. It is to be understood that cadets obtaining these positions will be reported to the Adjutant-General of the army as distinguished cadets.
3 laboratory hours, credit, 1.
Captain FLEET.

80. **III.** DRILL. — Seniors. As stated under Course 78.
3 laboratory hours, credit, 1.
Captain FLEET.

## Physical Education and Hygiene.

Associate Professor HICKS, Mr. GORE, Mr. FITZMAURICE.

### PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in military science. All classified undergraduate students are given a physical examination upon entering.]

*Required Courses.*

1. **I.** HYGIENE. — Freshmen. Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation.
1 class hour. Credit, 1.
Professor HICKS.

5. **II.** ELEMENTARY GYMNASTICS. — Freshmen. Exercises, games and athletics.
3 laboratory hours, credit, 1.
Mr. GORE and Mr. FITZMAURICE.

26. **II.** GRADED GYMNASTICS. — Sophomores. Exercises, games and athletics.
3 laboratory hours, credit, 1.
Mr. GORE and Mr. FITZMAURICE.

51. **II.** Gymnastics. — Juniors. Drills, games and athletics.
3 laboratory hours, credit, 1.
Mr. Gore and Mr. Fitzmaurice.

*Elective Course.*

77. **III.** Training Course. — Seniors. History of physical education; supervision of indoor and outdoor athletic contests and games; athletic administration.
1 class hour. Credit, 1.
Professor Hicks.

# THE GRADUATE SCHOOL.

# THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

CHARLES H. FERNALD, Ph.D., Honorary Director of the Graduate School.

CHARLES E. MARSHALL, Ph.D., Director of the Graduate School and Professor of Microbiology.

GRADUATE STAFF, 1916-17.

Professor ANDERSON, Professor CANCE, Professor CHAMBERLAIN, Associate Professor CHENOWETH, Professor CRAMPTON, Professor FERNALD, Professor FOORD, Professor GRAHAM, Professor HART, Dr. ITANO, Assistant Professor JONES, Professor LINDSEY, Professor MCNUTT, Associate Professor NEHRLING, Professor OSMUN, Professor PETERS, Professor SEARS, Dr. SHAW, Associate Professor VAN SUCHTELEN, Professor WAUGH, Director MARSHALL, President BUTTERFIELD; Mr. WATTS, Secretary.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years; the degrees of master of agriculture and doctor of agriculture are now granted to meet strictly professional needs. The number of requests for each of these courses is apparently increasing. In recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station specialists in farm management, dairying, live-stock husbandry, poultry science, agronomy, landscape gardening, pomology, vegetable gardening and floriculture; for positions as bacteriologists, botanists, chemists, entomologists; and for numerous other positions requiring a great amount of scientific knowledge, training and experience.

## ORGANIZATION.

The school is based upon the department as the unit, and the apprenticeship system as the most effective means of instruction. This gives to the student individuality in treatment and an intimacy with actual conditions of work and operations. Besides, each student is assigned to an advisory committee, composed of the instructor in charge of his major subject as chairman, and instructors in charge of his minor subjects as members, which directs his graduate studies. The chairmen of all these committees together constitute the graduate staff, which controls the policy of the graduate school.

## ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.
2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the instructor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership in the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

### NATURE, METHODS AND REQUIREMENTS OF GRADUATE WORK.

Graduate work differs from undergraduate work in its purposes and methods. The primary aims of the instructor are emphasized in an attempt to have the student adjust himself and place himself in his environment; develop the rule of self-direction and self-instruction; acquire the power of accurate reasoning; gain proficiency and skill in his selected field of study or practice; and obtain an appreciative and discriminative insight into experimentation and original research. Methods are not devised, therefore, for attractiveness, entertainment and superficial reviews, but for the creation of initiative and profound thought, thorough acquaintance with detail, independent advance and industrious habits. Careful reading, lectures, conferences, surveys, laboratory exercises and field work are some of the agencies utilized.

All members of the graduate school are required to attend the course of lectures designed to supplement the technical work of all graduate studies. These lectures will be given once each week, and the students will be held responsible for the work.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as a major and the other as a minor. These subjects may not be selected in the same department. An original thesis is considered a part of the major subject.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major and the others as minors. No two of these subjects may be taken in the same department. An original thesis shall be considered a part of the major subject.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary properly to equip the individual professionally.

Candidates for the degree of doctor of agriculture are required to select a major and such other subjects as will develop the major in its greatest intensity and comprehensiveness. Successful experience is also requisite, together with a thesis which represents a masterly survey or intimate study through accurate application of some phase of the major subject.

Candidates for membership in the graduate school who do not desire to work for a degree may, with the approval of the director of the school, take more than one subject in the same department, or pursue work in several departments, if their preparation will permit. A statement of the subjects chosen must in each case be submitted to the director of the graduate school for approval by the student's advisory committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised and credit granted as are essential to the highest standards of efficiency.

### THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject; must show that its writer possesses the ability to carry on original study; and must be an actual contribution to knowledge.

The thesis in its final form, must be submitted to the director by May 15 of the year in which the student is to present himself for the advanced degree, and before he may take the required oral examination. Three complete copies are required. One of the said copies is to be retained as an official copy by the said director, one is to be deposited in the college library, and the third is to be retained by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis.

### FINAL EXAMINATIONS.

For the degree of master of science or master of agriculture, final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degrees of doctor of philosophy or doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

### DEGREES CONFERRED.

The degrees of master of science and master of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half[1] to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours[1] each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary. The thesis may be waived for the degree of master of agriculture.

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[1] All time statements refer to minimum time.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the instructors in charge.

5. The payment of all fees and college expenses required.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours[1] each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the instructors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science or master of agriculture is $10, and for the degree of doctor of philosophy or doctor of agriculture, $25.

### COURSES OFFERED.

Courses available as major subjects for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.
Microbiology.

Courses available as major subjects for the degree of master of science: —

Agriculture.
Agricultural economics.
Agricultural education.
Agronomy.
Animal husbandry.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.

Courses available as major subjects for the degree of master of agriculture: —

Agronomy.
Animal husbandry.
Poultry science.

Courses available as minor subjects for the degree of doctor of philosophy: —

Agriculture.
Agricultural economics.
Agricultural education.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Microbiology.
Poultry science.
Rural sociology.
Zoölogy.

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[1] All time statements refer to minimum time.

Courses available as minor subjects for the degree of master of science: —

Agriculture.
Agricultural economics.
Agricultural education.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape gardening.
Microbiology.
Mathematics and physics.
Poultry science.
Rural sociology.
Veterinary science.
Zoölogy.

## General Outline of Courses for Advanced Degrees.

Agricultural Economics (Major Course). — 1. Graduate research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances the method includes facility in investigation, tabulation and interpretation of results.

2. Candidates for the master's degree, or candidates offering a minor in agricultural economics, will be required to pass an examination covering the undergraduate work now offered in agricultural economics, including Course 50, the elements of economics, Course 75, the agricultural market and Course 52, co-operation in agriculture; and in addition such definite research work as may be outlined by the department, to consist of original investigations in some particular divisions of the subject of agricultural economics. Courses 52, 75, 76 and 77 are for graduates and undergraduates. Special investigations may be made by electing seminars in agricultural economics.

3. Candidates for the master's degree will be required to write a thesis or a report covering results of a specific line of personal investigation in one or more fields of the subject. Each candidate will also be required to have a working knowledge of the general field of economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, statistics of agriculture and prices, and markets and marketing.

Agricultural Education (Major Course). — Courses are available in agricultural education as major or minor subjects for the degree of master of science, or, as a minor subject, for the degree of doctor of philosophy. Study will be pursued along one or several of the following lines: —

1. Massachusetts school legislation.
2. Origin and growth of primary, secondary and higher education in Massachusetts.
3. The origin and growth of normal schools, industrial schools and agricultural schools.
4. Educational literature, fiction, periodicals and reports.
5. The physical and mental development of the individual.
6. School administration.

Agronomy (Master of Science). — This course is developed in two directions, depending on whether the candidate is preparing for investigational work or for teaching. In the former case more attention is paid to methods of investigation; in the latter, to interpretation of results. The student may specialize in either Part I. or Part II. of the following: —

I. *Soil Fertility.* — (*a*) The humus problem: Effect of different cropping systems on the humus content of the soil; cultivation, drainage and liming in their effect on soil humus; increase by green manure crops; use of animal manures as sources of humus; conservation of organic matter.

(*b*) The nitrogen question: Losses of nitrogen as occasioned by cropping systems, tillage methods and soil treatment; gain of nitrogen through legumes and other agencies; commercial nitrogen, physiological effect upon the plant, comparison of different forms both in regard to their ultimate as well as immediate effect, amount of application from the business standpoint.

(*c*) Mineral elements of plant food: As above for nitrogen.

(*d*) Lime: Causes of "soil acidity;" comparison of forms of lime; ultimate effect of lime on soil fertility; cost *versus* returns from use of lime.

(*e*) Crop adaptability.

II. *Field Crops.* — (*a*) Distribution, as governed by soil fertility; climatic influences; economic conditions.

(*b*) Kinds and varieties.

(*c*) Cultural methods.

(*d*) Breeding: A knowledge of the principles of breeding is presupposed. With this as a basis, a study of methods, practices and results, as applied to a given crop, must be made.

III. *Thesis.* — The thesis may be taken either in soil fertility or in crop production. In either case a problem for original investigation must be formulated by the candidate, the line of attack developed, the work carried through and results presented in acceptable form.

*Literature.* — It is required that the candidate familiarize himself with the available literature of the various topics studied.

ANIMAL HUSBANDRY (Master of Science). — *Course A. Animal Breeding.* — 1. Reading: Thorough survey of the scientific works dealing with plant and animal breeding and improvement.

2. Project: Each student must outline and pursue some Mendelian problem.

3. Thesis: This is to be a complete treatise of the problem which the student undertakes; it should be a valuable contribution to the present knowledge of the question of animal breeding

*Course B. Animal Nutrition.* — This course is in outline similar to A. It is designed to cover the field of nutrition, feeding and management of live stock.

Seminar: Regular periods will be devoted to a discussion of the projects undertaken, together with criticisms of the available material on the question pursued.

*Object.* — To give the student a comprehensive knowledge of feeding, breeding and management of live stock. This may be divided into a major and a minor, in order to give the student the opportunity of devoting a proportionate share of his time to the class of live stock in which he is particularly interested.

*Reading.* — The student is to make a very complete survey of experimental and periodical literature dealing with the various phases of the subject.

*Practice.* — Before the completion of the work for the degree, the student must have the equivalent of at least one year's continuous work on an approved live-stock farm.

*Seminar.* — Regular periods to discuss progress of the work.

ANIMAL PATHOLOGY (Minor Course only). — 1. Reviews in anatomy.

2. Reviews in organography and histology.

3. Special lectures and readings in general and special pathology.
4. Laboratory studies in general and special pathology.
5. Pathological technique.
6. Conferences.

BOTANY (Major Courses). — The equivalent of certain undergraduate courses, determined in the case of each student by the department, is prerequisite. Candidates for the degree of master of science are required to pass a final examination in writing. A final examination in writing before the department and an oral examination before the graduate staff must be passed by candidates for the degree of doctor of philosophy. Candidates for the latter degree are required to attend all graduate lectures given by the department. Candidates for the degree of master of science will take those lectures given during their period of study in the department. All lecture courses will be given in rotation, except courses (*a*) and (*b*), which will come every year. There will be three lectures a week throughout the fall, winter and spring terms. These lecture courses, outlined below, are designed to cover a period of three years.

(*a*) *Plant Physiology.* — The lectures will consider, under the nutrition of the plant: its chemical structure, absorption of various nutrient substances and their changes in the plant, assimilation and dissimilation of carbon and nitrogen by autotrophic and heterotrophic plants; under changes in the form of plants: growth and form under constant external factors, the influence of variable external and inner factors on growth, form and development; and under plant movements: the various tropisms, nutations, etc. Supplemental demonstrations, laboratory work and readings in the standard texts and journals. One lecture a week for 36 weeks.

(*b*) *Plant Pathology.* — A general consideration of the history, nature and causes of plant disease; parasitism, predisposition, immunity, degeneration, natural and artificial infection, dissemination, epidemics, biologic strains, monstrosities and malformations, proliferation, prevention and control, economics of plant diseases. One lecture a week for 36 weeks.

(*c*) *Normal and Pathogenic Metabolism.* — The lectures in this subject embrace, in more or less detail, comparative consideration of the metabolism of the host in health and disease; the metabolism of the parasite under varying conditions; enzyme activities in host and parasite; methods of preparation and determination of enzyme activities; chemical and physical changes induced in plant tissue by parasites; immunity, etc. Current investigations and new phases of the subjects under discussion will also receive attention as they appear. One hour a week for 24 weeks.

(*d*) *Plant Evolution.* — Consideration of plant life in its inception; differentiation; origin and evolution of sexual and asexual reproduction; variation; heredity and adaptation; phylogenetic relationships. One lecture a week for 24 weeks.

(*e*) *Biologic Relations.* — Consideration of certain phases of the morphological and physiological adaptations of plants with regard to insect visit; the rôle of thorns, hairs, tendrils, glands, etc. Various experiments will be made to test out experimentally some of the existing theories concerning biologic adaptations. One lecture a week for 12 weeks.

(*f*) *The Ecology of Plants.* — This course deals with the water, light and temperature relations of plants, and the various adaptations in response to these factors; the various types of plant formation; the migration of plants;

the competition of plants; invasion and successions of plants under varied conditions; and the various types of alternations and zonations. One lecture a week for 12 weeks.

(*g*) *Physiological Plant Pathology.* — This course considers those plant diseases not due to bacterial or fungous parasites, but resulting from unfavorable physical or chemical conditions of the soil; from harmful atmospheric influences, such as too dry air, too much moisture, hail, wind, lightning, frost; from injurious gases and liquids; from lack of or too much light; from wounds. A knowledge of the normal physiology of the plant is required. Demonstrations and laboratory work will be given, together with assigned readings. One lecture a week for 12 weeks.

(*h*) *History of Botany.* — A historical survey of the science; history of certain culture plants, such as wheat, corn, coffee, potato, rice, and their influence on civilization. One lecture a week for 18 weeks.

Seminar: A weekly seminar for members of the department staff, graduate students and major senior students is held, at which important current botanical papers are discussed. Attendance and participation are required.

Collateral Reading: Extensive reading of botanical literature in English, German and French, designed to give the student a broad knowledge of the science, is required of all major students. Final examinations are based in part upon this reading course.

Thesis: Each major student is required to select a problem in plant pathology or physiology (in other branches at the discretion of the department) for original investigation, and the thesis must embody a distinct contribution to knowledge. An effort will be made to assign problems having some bearing on scientific and economic agriculture.

Professor OSMUN, Dr. CHAPMAN, Associate Professor ANDERSON, Assistant Professor CLARK.

Minor Course. — For a minor a student may take such of the work offered by the department as seems best suited to his major course. In most cases no problem will be assigned.

CHEMISTRY. — I. Major courses for the degree of master of science. Students will be required to take Courses 101, 108 to 114. In addition to this the requirements in the various thesis subjects are: —

*Organic and Bio-Chemistry.* — Courses 115 and either 105, 106 or 107, and 6 hours for one term selected from Courses 103 (*b*) and (*f*), and 104.

*Analytical and Industrial Agricultural Chemistry.* — Courses 116, 103 (6 hours), and 6 hours for one term selected from Courses 102, 104 to 107.

*Physical Chemistry.* — Courses 104, 117, and 6 hours for one term selected from Courses 102, 103, 105 to 107.

*Agricultural Chemistry.* — Courses 103 (6 hours), 118, and 6 hours for one term selected from Courses 102, 104 to 107.

The candidate must pass a final written and oral examination before the Department of Chemistry upon undergraduate Courses 1 to 80, inclusive, and upon all graduate work taken in chemistry by him.

II. Major course for the degree of doctor of philosophy. Students will be required to take Courses 101 to 114, and one course selected from 115 to 118. In addition, the student may be required to spend at least two terms or one semester at some other recognized institution pursuing graduate work in chemistry. The candidate must pass a final written examination before the

Department of Chemistry, and an oral examination before the graduate staff, upon the whole field of chemistry, and must be especially well prepared in the lines of work covered by his research.

III. Minor course for the degrees of master of science and doctor of philosophy. Students will be required to take work totaling 54 to 78 hours. This may be selected from any of the undergraduate Courses 27 and 51 to 80, or any of the graduate courses for which the student is prepared. In addition, the candidate must pass a final written and oral examination before the Department of Chemistry upon the courses taken and upon undergraduate Courses 27 and 51 to 80.

The following is a list of the courses: —

101. *Inorganic Preparations.* — Laboratory. The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Ten to fifteen of the preparations given in Biltz's "Laboratory Methods of Inorganic Preparations" will be made by each student. Any term, 6 hours. Professor ANDERSON.

102. *Advanced Inorganic Preparations.* — Laboratory. Continuation of Course 101. Any term, 6 hours. Professor ANDERSON.

103. *Advanced Analytical Chemistry.* — Laboratory. This course may be taken in part as follows: (*a*) electrolytic analysis, 6 hours; (*b*) ultimate analysis, 6 hours; (*c*) special analytical work to meet the needs of the individual student, 6 hours. In addition, parts of undergraduate Courses 61, 62, 76 and 77 may be taken, as follows: (*d*) fertilizers, 6 hours; (*e*) insecticides, 6 hours; (*f*) milk and butter, 6 hours. (*a*), (*b*), (*c*) may be taken any time; (*d*), (*e*), (*f*) must be taken at the time the undergraduate course is given.
Professor WELLINGTON and Professor PETERS.

104. *Advanced Physical Chemistry.* — Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; per cent. hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; critical temperature of carbon dioxide or sulphur dioxide; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; adsorption of iodine by charcoal; splitting of racemic glycerinic or racemic tartaric acids into their optical components. To each student separate work will be assigned. Any term, 6 hours. Professor ANDERSON.

105. *Advanced Organic Preparations.* — Laboratory. The preparation of compounds not included in Courses 51 and 52, such as the Kolbe synthesis of salicylic acid; benzophenone and Beckmann's rearrangement; rosaniline, malachite green, congo red, indigo and other dyes; synthesis of fructose; Grignard reaction. Barnett, Cain and Thorpe, Gatterman, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Any term, 6 hours. Professor CHAMBERLAIN.

106. *Advanced Bio-Chemistry.* — Laboratory. The hydrolysis of proteins and isolation of the amino acids; the study of milk, blood and urine; dietary and digestion studies. References: Abderhalden, Plimmer, Salkowski, Hawk, etc. To each student separate work will be assigned. Any term, 6 hours. Professor CHAMBERLAIN.

107. *Industrial Organic Chemistry.* — Laboratory. The preparation, on a large scale, of wood alcohol, acetic acid, ethyl alcohol, benzene and cellulose products, such as mercerized cotton and artificial silk. References: Molinari, Rodgers and Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Any term, 6 hours. Professor CHAMBERLAIN.

108. *Theoretical Chemistry.* — Lectures. The following topics are considered: the compressibility of the atoms; the structure of atoms; the electron conception of valence. First term, 1 hour. Given in 1917–18. Alternates with Course 109. Professor PETERS.

109. *Analytical Chemistry.* — A general survey of methods and technique covering processes commonly carried out in the laboratory. Gooch's Quantitative Analysis is used as a text. First term, 1 hour. Given in 1916–17. Alternates with Course 108. Professor PETERS.

110. *Organic Chemistry.* — Lectures. Some of the following topics will be considered both theoretically and industrially: alkaloids, synthetic dyes, essential oils, terpenes, rubber, etc.; the study of methods for carrying out general reactions; isomerism, tautomerism, condensation, etc. References, Cain & Thorpe, Cohen, chemical monographs, Lassar-Cohn, Heinrichs, Molinari. Second term, 1 hour. Given in 1916–17. Alternates with Course 111. Professor CHAMBERLAIN.

111. *Bio-Chemistry.* — Lectures. Some of the following topics will be considered both chemically and physiologically: fats, cholesterol, lecithin, carbohydrates, amino acids, proteins, urea, uric acid, purine bases, enzymes, fermentation, animal food and nutrition, photosynthesis. References, Monographs on Bio-Chemistry, Abderhalden, Plimmer, Haas & Hill, Lewkowitsch, Fischer, Euler, Mathews, Czapek. Second term, 1 hour. Given in 1917–18. Alternates with Course 110. Professor CHAMBERLAIN.

112. *Theoretical and Physical Chemistry.* — Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hindrances; stereoisomerism of other elements than carbon; molecular association; similarity between the compounds of silicon and carbon. Third term, 1 hour. Given in 1917–18. Alternates with Course 113. Professor ANDERSON.

113. *Theoretical and Physical Chemistry.* — Lectures. Radioactivity; the application of physical chemistry to industrial chemistry. Third term, 1 hour. Given in 1916–17. Alternates with 112. Professor ANDERSON.

114. *Seminar.* — Conferences, reports or lectures. Three terms, twice a month, 1½ hours. Professor LINDSEY.

115. *Research in Organic and Bio-Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor CHAMBERLAIN.

116. *Research in Analytical or Agricultural Industrial Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by the amount of work done.

Professor WELLINGTON and Professor PETERS.

117. *Research in Physical Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

Professor ANDERSON.

118. *Research in Agricultural Chemistry.* — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor LINDSEY and EXPERIMENT STATION ASSOCIATES.

ENTOMOLOGY (Major Courses, Ph.D. degree). — 1. *Morphology.* — Lectures on all, and laboratory work on a portion of the following subjects: embryology and polyembryology; transformations; histology; phylogeny; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogamy; chemistry of colors; coloration; luminosity; deformities; variation.

2. *Ecology.* — Lectures and laboratory work as above on the following subjects: dimorphism; polymorphism; protective devices; mimicry; psychoses; insect architecture; plant fertilization; insect products; geographical distribution; methods of distribution; migration; geological history; insects and disease; enemies of insects, vegetable and animal; duration of life; experimental entomology.

3. *Economic.* — Lectures and laboratory work as above on the following subjects: special methods of control; insecticides; special research; insect photography; methods of preparing illustrations; field work and life-history investigations; insect legislation; methods of record keeping.

4. *Systematic.* — Lectures and laboratory work as above on the following subjects: history of entomology; classifications and principles of classification; nomenclature and its rules; how to find and use literature; preparing indices; number of insects known and in existence; lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections; location of types.

5. Seminar; required readings; thesis.

Professor FERNALD, Professor CRAMPTON, Dr. REGAN.

All of these five courses are required of students taking a Ph.D. in entomology.

Minor Courses. — Such portions of the major courses as are most closely correlated with the other lines of work taken by the student and which can be completed in the time available.

Horticulture. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now constitute the college Division of Horticulture, as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Prof. F. A. Waugh, head of the Division of Horticulture.

Landscape Gardening (Major Course). — Every student before receiving his master's degree in landscape gardening must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. *Theory.* — The principles of esthetics as applied to landscape gardening.
2. *Design.* — The principles of pure design and their application in landscape and garden planning.
3. *Construction.* — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.
4. *Maintenance.* — Methods, organization, cost.
5. *Practice.* — Office work, drafting, estimating, reporting, charges, accounting.

*Qualifications.* — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

The minimum period of graduate study will be one and one-half years. At least one year of this time must be spent in residence at the college, and also one year must be spent in practice outside the college. The work done outside the college may be prescribed by the department, and must be fully reported to the department in writing. It is essential, further, that the candidate secure the written approval of his employers outside the college. The department may, at its discretion, require a longer period of study at the college or a longer apprenticeship outside the college.

*Thesis or Project.* — Each student before receiving the master's degree with a major in landscape gardening must present a satisfactory thesis or complete project. A thesis will consist of a careful original study of some problem in landscape architecture, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of —

(*a*) Original surveys, including topography.
(*b*) Block plans, showing original design.
(*c*) A rendered plan or plans of the main features.
(*d*) Detailed working drawings.

(*e*) Estimates of cost.

(*f*) Complete report and letter of transmittal.

Minor Course. — Any student electing a minor in landscape gardening will be directed to take such courses from the regular catalogue list as may seem most suitable for him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

*Prerequisite Work.* — The undergraduate courses in the college known as Landscape Gardening 50, 51, 52 and 53, Drawing 25, 26, 27, Horticulture 27, 50, 51, and Mathematics 26 and 27 will be considered prerequisite to graduate work, and any student not having passed these courses or their equivalent will be required to make up such work without graduate credit. Courses known as Landscape Gardening 75, 76, 77, 78 and 79 are required and may or may not be accepted for graduate credit, at the discretion of the department.

MICROBIOLOGY (Major Course). — 1. *Reading.* — Readings will be assigned and reports with critical analyses of literature covering the general subject will be required. For this purpose such material will be selected as will be most pertinent to the needs of the student. Lectures will be given from time to time.

2. *Seminar.* — At intervals the immediate laboratory work and studies of the student will be surveyed and the literature bearing thereon will be discussed. The shaping of investigations in accordance with the critical analyses of the specific literature of the problem involved will be the important rôle of the seminar.

3. *Morphological and Cultural Studies.* — Special advanced studies in the cytology, morphology and cultural characters of micro-organisms will be the general theme of this course. The important factors in classifying and grouping organisms call for an intimate knowledge of this particular phase of microbiology. Laboratory technic will receive emphasis.

4. *Physiological Studies.* — The changes produced by micro-organisms and their functionings in general open a very broad field for investigation and systematic study. It is advised that every graduate student in microbiology give much attention to this branch, gaining thereby the greatest comprehensive knowledge of physiological processes, as well as the methods employed in their determinations.

5. Special advanced courses will be offered in those phases of microbiology indicated by the undergraduate courses: —

1. Fermentation microbiology.
2. Soil microbiology.
3. Dairy microbiology.
4. Food microbiology.
5. Hygienic and sanitary microbiology.

It will be assumed that all graduate students of microbiology must be acquainted with the details of all important phases of agricultural microbiology.

Minor Course. — 1. Courses constituting undergraduate major in microbiology, or their equivalent, will be required.

NOTE. — If the student is familiar with the work of these courses, advanced work will be given in accordance with the graduate major outline.

2. Emphasis will be placed upon that particular phase of microbiology which will be particularly pertinent to the student's major course.

3. Readings will be assigned, and will be reviewed in conferences.

4. Special lectures on selected subjects in microbiology will be given from time to time.

Poultry Science (Major Course for the Degrees of M.S. and M.Agr.). — 1. *Reading.* — A review of the entire field of poultry literature, covering books, bulletins and special articles, is made, and a written report on one or more subjects required.

2. *Seminar.* — A critical review and a criticism of the more important experiments carried on at the various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc., besides a detailed study of some of the largest poultry projects in this country.

3. *Anatomy (Gross and Histological), Physiology and Surgery.* — This course requires a careful study of the anatomy and physiology of the fowl. Special attention is given to a study of those structures concerned with practical poultry problems. Instruction in surgical technique, adapted to fowls, may also be given.

4. *Breeding.* — The student will carry on such breeding experiments as time and facilities permit. He may also do work in connection with our regular experimental projects. A detailed study of the pertinent literature will be required. Animal Husbandry 5, or its equivalent, is a prerequisite.

5. *Feeding.* — A study of the relation of various foods and other substances to the morphology and physiology of the bird, with special reference to such subjects as egg production, feather form and structure, condition of flesh, bone, etc.

6. *Brooding.* — Studies will be made upon the relation between viability and rate of growth and the following topics: type of brooder, number of chicks in brood, ventilation, humidity, sanitation, exercise and weather conditions; also a comparison of natural methods with artificial methods of rearing chicks.

7. *Incubation and Embryology.* — A number of problems of a practical, scientific and mechanical nature relating to incubation are considered. The work in embryology is of an advanced nature dealing with its relation to morphogenesis and heredity, and presupposes an elementary knowledge of the embryology of the chick.

8. *Poultry Diseases and Sanitation.* — In this course a study is made of various problems in poultry sanitation, with particular reference to methods relating to the control and eradication of disease.

9. *Thesis.* — A thesis based on first-hand work on some problem in poultry biology or husbandry is required of all students working for the M.S. degree, and may be required of those working for the M.Agr. degree.

Note 1. The postgraduate course presupposes all undergraduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 5, 6 and 7. At the discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

Note 2. Practical poultry work may be required, but no credit will be given for such work.

Note 3. Courses 1 and 2 are designed particularly for minors.

RURAL SOCIOLOGY. — Courses are offered in Rural Sociology as major or minor subjects for the degree of doctor of philosophy.

Candidates for the master's degree will be required to pass an examination in all courses offered by this department primarily for undergraduates, as shown in the departmental classification. In addition they will be required to select one or more of the divisions of the subject for intensive study and research, as indicated below.

A thesis showing the results of personal investigation on some particular topic or topics must be presented. The thesis must show familiarity with the material bearing on the subject, ability in discovering and utilizing original sources, judgment in evaluating facts, evidences and authorities, originality and independence of thought. It must be a contribution in a very definite way to rural sociological thought.

### TOPICS FOR STUDY AND RESEARCH.

1. The rural community: —
    - (*a*) Historical development.
    - (*b*) Influence of modern conditions on family and community life.
    - (*c*) Problems and methods in community organization.
    - (*d*) Community planning in Massachusetts.
2. Origin and development of rural institutions: —
    - (*a*) Scope, function and influence of educational institutions on rural social progress. Plans for betterment.
    - (*b*) History of the development of the rural church, its problems and program for improvement.
    - (*c*) The farm family, in its relation to religious, cultural, educational and social agencies. The relation of the standard of living to rural social progress.
3. Rural organization: —
    - (*a*) The scope and function of rural organization in development of rural life.
    - (*b*) Work of the national government in rural organization.
    - (*c*) County and institutional work in rural organization.
    - (*d*) Leadership in its relation to organization.
4. Rural government and rural law: —
    - (*a*) Development of rural local government in New England and the west. Progress in efficient local self-government.
    - (*b*) Relation of the State to the farmer, influence of the farmer in legislation, the organized ways and means by which the State aids the farmer directly.
    - (*c*) Work of the national government in its relation to the social welfare of the farming people.
    - (*d*) Agrarian legislation in the United States and Europe affecting rural social welfare.
5. Farmers' organizations: —
    - (*a*) Social problems underlying farmers' organizations in reference to service and permanency.
    - (*b*) Principles of organization.
    - (*c*) History of farmers' organizations in the United States.
6. Rural social and sociological surveys: —
    - (*a*) An intensive study of the place and function of statistical data in the sociological field, its evaluation and interpretation.
    - (*b*) A critical study of social surveys of rural life and methods of survey, with a view to discovering the strength and weakness of each.
7. Social condition of the rural people: —
    - (*a*) Origin and development of rural ideals.
    - (*b*) The status of the rural people in relation to health, morality, crime, etc.
    - (*c*) Problems of social psychology arising in rural life.

The course required for candidates offering a minor will be arranged after a conference with the director of the department, and will take into consideration the needs of the student in view of his previous preparation. The amount of time required of the student for his minor work will correspond with the requirements of the graduate school.

VETERINARY SCIENCE. — Work is available in anatomy, hygiene, veterinary pathology, medicine, surgery, parasitology and other special lines or divisions of the subject.

ZOÖLOGY. — Courses in zoölogy may be available as a minor for the degree of master of science and as a minor for the degree of doctor of philosophy. The nature of the work will necessarily vary according to circumstances, and may be intensive in a special field, like that of embryology or economic ornithology, and be correlated closely with the major work of the student, or it may be of a more general character, depending on the student's needs or previous acquaintance with general zoölogical science. The time devoted to zoölogy as a minor for either of the above-named degrees may vary from 12 to 16 hours per week, pursued for a year and a half.

### LIST OF STUDENTS.

A list of the degrees conferred in the Graduate School, and of the students enrolled, is given in the general lists at the end of the volume.

# THE SHORT COURSES

AND

# THE EXTENSION SERVICE.

# THE SHORT COURSES.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those who cannot come to the college for the regular academic courses. They furnish the student with instruction in modern accepted methods, and are made as concentrated and as practical as possible. In the main, the instruction is given by the regular teaching force of the college, the same laboratories and equipment being used as in the regular college work.

The short courses may be grouped as follows: —

A. Winter Schools.
  1. Ten Weeks' Course.
  2. Spring Beekeeping School.
  3. Apple Packing School.
B. Summer Schools.
  1. Summer School of Agriculture and Country Life.
  2. School for Rural Social Service.
  3. School for Library Workers.

EXPENSES OF THE SHORT COURSES. — The expense of attending any of the short courses is approximately as follows: —

| | |
|---|---|
| Registration fee (Ten Weeks' Course, Apple Packing School, Summer School), | $5 |
| Furnished rooms in private houses (per week), | $1.50–$3 |
| Board at college dining hall (per week), | $4.50–$5 |
| Board with private families (per week), | $6–$7 |

A lunch counter is operated in connection with the college dining hall. Meals may be obtained there *à la carte* at very reasonable rates.

Students in each of the dairy courses must provide themselves with two white wash suits and caps for use in the practical dairy work. The cost in Amherst is about $1.25 for suit and cap.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic. Practical experience in farm, garden, orchard or greenhouse work is an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character. References are required, and these are investigated before applicants are accepted.

## A. WINTER SCHOOLS, 1917.

1. OUTLINE OF THE TEN WEEKS' COURSES (JANUARY 1 TO MARCH 9, INCLUSIVE). — The following courses are offered: —

1. Soil Fertility. Assistant Professor JONES. Three lectures a week.
2. Field Crops. Assistant Professor JONES. Two lectures and one two-hour laboratory period a week.

3. Types and Breeds of Live Stock. Professor McNutt. Three lectures and two two-hour judging periods a week.
4. Live Stock Feeding. Assistant Professor Quaife. Three lectures a week.
5. Animal Breeding. Professor McNutt. One lecture and one two-hour laboratory period a week.
6. Dairying. Professors Lockwood and Jamison, Mr. Coons. Five lectures and one one-hour, two two-hour and two three-hour laboratory periods a week.
7. Dairy Bacteriology. Professor Marshall. Two lectures a week.
8. Animal Diseases and Stable Sanitation. Professor Paige. Two lectures a week.
9. Poultry Husbandry. Professor Graham and Mr. Payne. Five lectures and one two-hour laboratory period a week.
10. Farm Management and Farm Accounts. Professor Foord. One lecture and one two-hour laboratory period a week.
11. Fruit Growing. Professor Sears. Three lectures and one two-hour laboratory period a week.
12. Market Gardening. Assistant Professor A. S. Thomson. Three lectures and two two-hour laboratory periods a week.
13. Landscape Gardening. Assistant Professor Harrison. Two two-hour periods a week.
14. Floriculture. Associate Professor Nehrling. Three lectures a week; field trips on Saturday.
15. Forestry. Professor Clark. One lecture a week.
16. Botany. Assistant Professor Anderson. Two lectures a week.
17. Entomology. Dr. W. S. Regan. Three lectures a week.
18. Beekeeping. Associate Professor Gates and Mr. Byard. Two lectures and one two-hour laboratory period a week.
19. Farm Mechanics. Professor Gunness. One lecture and one two-hour laboratory period a week.
20. Rural Sanitary Science. Professor Marshall. Two lectures a week.
21. Rural Improvement. Professor Waugh. Two lectures a week.
22. Problems of Marketing and Distribution. Professor Cance. Two lectures a week.

1. Spring Beekeeping School. — This school is held in Amherst once in three years, being conducted in other sections of the State in intervening years. It is an intensive course for a limited number of beekeepers. It occupies seven hours daily for a period of two weeks. Courses are given in practical beekeeping; life of the honeybee; special problems of the beekeeper; crops foraged by bees; relation of bees to pollination of plants; bees in horticultural practice. The instructors are Professors Gates, Fernald, Paige, Brooks, Osmun and Chenoweth and Mr. Byard. Dates to be announced.

2. Apple Packing School. — The work of this school, which is conducted by the Department of Pomology, is of a practical nature, and includes both box and barrel packing. Persons taking the course will become familiar with the various types of packs, and will receive sufficient practice to enable them to do good commercial packing. The 1917 school will probably be held in November, on dates to be announced.

### B. Summer Schools.

1. The Summer School of Agriculture and Country Life. — The Summer School of the Massachusetts Agricultural College will open July 2, 1917, for a term of four weeks. The work of the summer school was designed originally for teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Practical courses are offered for the benefit of such persons.

The formal instruction in the summer school is given in definite courses. Each student may elect not less than 10 nor more than 15 exercises a week, unless a larger or smaller amount of work is allowed by the supervisor. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

General field exercises are arranged for one afternoon of each week. These are on topics of interest to all. Excursions are arranged for every Wednesday afternoon, and more extended excursions for the whole school are planned for every Saturday. These excursions are in charge of an instructor. In the past they have proved a very enjoyable feature of the work. Round-table and special discussions are arranged by the various instructors as their courses require.

A course of evening lectures on popular topics relating to the work of the school is a feature of the general program. This lecture course is free to all students.

Early registration is desirable. Registration fee for the summer school is $5, payable at the time application is made. No other tuition is charged. This fee should accompany application blank and should be made payable to the Massachusetts Agricultural College.

2. THE SCHOOL FOR RURAL SOCIAL SERVICE. — The Massachusetts Agricultural College offers a School for Rural Social Service in connection with the usual Summer School of Agriculture and Country Life. The courses offered give instruction, furnish information and direct the attention of those interested more particularly to the rural field, which has as yet received little systematic study when compared with that which has been given to urban conditions.

The courses offered are intended for clergymen, teachers, librarians, town officers, grange workers and others who devote a considerable portion of their time to problems of community development. Other courses given in the summer school during this period are also open to those who register. There is a registration fee of $1 for those attending this school. The dates are to be announced.

3. SCHOOL FOR LIBRARY WORKERS. — During the summer of 1915 a very successful School for Library Workers, of one week's duration, was held at the college. The work was planned especially for those librarians and library assistants in village and rural libraries whose special training and experience had necessarily been limited. This school will again be offered in July, 1917.

The faculty of the 1916 summer schools was as follows: —

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.
WILLIAM D. HURD, M.Agr., Director of the Extension Service and Supervisor of Short Courses.
CHARLES R. GREEN, B.Agr., Librarian of the College.
F. JOSEPHINE HALL, A.M., Adviser for Women.
JOHN L. BYARD, Superintendent of Apiary.
ALEXANDER E. CANCE, Professor of Agricultural Economics.
WALTER W. CHENOWETH, M.Sc., Associate Professor of Pomology.
WILLIAM D. CLARK, A.B., M.F., Professor of Forestry.
LAURA COMSTOCK, Extension Professor of Home Economics.
SAMUEL COONS, Instructor in Dairying.
E. FARNHAM DAMON, B.Sc., Extension Associate Professor of Agricultural Economics.
HENRY T. FERNALD, Ph.D., Professor of Entomology.
JAMES A. FOORD, M.Sc.Agr., Professor of Farm Administration.
BURTON N. GATES, Ph.D., Associate Professor of Beekeeping.
HELENA T. GOESSMANN, M.Ph., Instructor in English.

Harold M. Gore, B.Sc., Assistant in Physical Education.
John C. Graham, B.Sc., Professor of Poultry Husbandry.
Edna A. Post, Organized Play.
Ida E. Hall, LL.B., Plays and Pageantry.
Earl Jones, M.Sc., Assistant Professor of Agronomy.
William P. B. Lockwood, M.Sc., Professor of Dairying.
Frederick A. McLaughlin, B.Sc., Instructor in Botany.
John C. McNutt, B.Sc.Agr., Professor of Animal Husbandry.
Charles J. Maynard, Naturalist and Lecturer, West Newton, Mass.
Orion A. Morton, Extension Professor of Agricultural Education.
Ezra L. Morgan, A.M., Extension Professor of Community Planning.
Ethel H. Nash, Extension Instructor in Agricultural Education.
Arno H. Nehrling, Associate Professor of Floriculture.
A. Vincent Osmun, M.Sc., Associate Professor of Botany.
Samuel R. Parsons, B.Sc., Instructor, Pennsylvania State College.
Charles A. Peters, PhD., Associate Professor of Inorganic and Soil Chemistry.
Frederick W. Ried, Director of Practical Arts, Framingham (Mass.) Normal School.
Marie Sayles, B.S., Extension Instructor in Home Economics.
F. A. Cushing Smith, B.Sc., M.L.A., Extension Instructor in Civic Improvement.
Leone E. Smith, B.Sc., Superintendent, Colchester (Conn.) Boys' Club.
Frank A. Waugh, M.Sc., Professor of Landscape Gardening.
Willard E. Waterbury, Field Secretary, Massachusetts Baptist Missionary Society, Boston.

### C. Miscellaneous Short Courses.

1. Short Courses for Special Groups. — Plans are now under way to provide short courses at Amherst, lasting four or five days, for fertilizer agents, feed agents and dealers, milk inspectors, seed dealers, bankers and other groups desiring such instruction. Information concerning these may be obtained by writing the Supervisor of Short Courses.

2. Special Days for Foreigners. — Each year there are provided at the college special days for foreigners. Instruction is given in soil management, co-operation, American citizenship and history. This work for foreigners will be arranged at the college, or in different sections of the State.

3. Meetings of Organizations at the College. — It is customary for the various State organizations of fruit growers, poultrymen, breeders and others to meet for conventions and picnics at the college. Such gatherings are welcomed by the college authorities, and organizations are cordially invited to meet in Amherst. The Extension Service will assist in arranging programs and other forms of instruction and entertainment.

All requests for announcements or further information regarding any of the short courses should be addressed to the Supervisor of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

# THE EXTENSION SERVICE.

What is known as the Extension Service is an organized effort on the part of the college to carry systematic and dignified instruction to the thousands of people throughout the State who are unable, owing to various reasons, to take advantage of the regular courses offered at the college. It is in reality the "carrying of the college to the people of the State." Every department of the institution, in so far as the regular teaching and research work will permit, contributes what it can to this work. The work may be roughly classified under the following general heads: general administration; correspondence study; itinerant instruction which includes lectures and lecture courses, exhibits, demonstrations and extension schools; extension work through the various departments of the college, in which the extension specialist is responsible to the head of the department for the technique of the work and to the director of the extension service for the accomplishment of the work; co-operative work of various kinds with the United States Department of Agriculture; and extension work through county, district and local agents. Some of the ways in which this is being done are described briefly below.

## COURSES GIVEN AT THE COLLEGE.

1. FARMERS' WEEK. — In order to reach those who cannot come to the college for a longer time this very practical course, five days in length, is given each year. The regular college equipment is used, and work of the regular faculty is supplemented by lectures and demonstrations by eminent men and women.

The 1917 program will probably be divided into seven sections, as follows: —

1. Field Crops and Farm Management.
2. Animal Husbandry and Dairying.
3. Poultry Husbandry.
4. Fruit Growing, Market Gardening, Floriculture, Forestry.
5. Women's Section, Home Economics.
6. Business Organization and Marketing.
7. Beekeeping.

These sections take up the time from early morning until late afternoon. Prominent men are engaged for the evening lectures. Fruit, corn, live stock, dairy and poultry shows, and other exhibits, are among the leading features. No fee is charged.

2. ANNUAL BEEKEEPERS' CONVENTION. — This convention of beekeepers is held during Farmers' Week. Illustrated lectures, practical demonstrations and commercial displays are features of the convention. Meetings of State and county beekeepers' associations and of apiary inspectors also are scheduled at this time.

3. Polish Farmers' Day. — A special day is each year set aside which is known as "Polish Farmers' Day." Instruction is given relative to the crops and animals in which the Polish people are most interested, soil fertility problems, co-operation, American citizenship, history, etc. Hundreds of Polish farmers reside in the Connecticut valley, and large numbers avail themselves of this opportunity which is peculiarly their own. It will be held on March 22, 1917.

4. Annual Conference of County Agents and Vocational Agricultural Instructors. — In December of each year a one-week conference of county agents and vocational agricultural instructors is held at the college. This is for the purpose of correlating the extension work throughout the State, and to enable the field workers to keep in up-to-the-minute touch with agricultural problems, methods and research as conducted in Massachusetts as well as other States in this particular section of the country. The next annual conference will probably be held during the third full week in December, 1917.

5. Poultry Convention. — In order to give a large number of poultrymen, who cannot come to the college for a long period of time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, and in marketing poultry products, an annual three-day convention is offered. This will be held from July 25 to 27, 1917, inclusive.

6. Agricultural Camps. — During the month of July three camps are arranged in order that boys from rural districts and small towns may receive some instruction in agriculture and clean, wholesome sports, and that they may have impressed upon them their responsibilities as coming members of society. The daily program consists of camp duty, flag raising, agricultural lessons, talks on hygiene and good citizenship, play and recreation, instruction in handicrafts, photography, evening camp fires and lectures by men prominent in boys' work. A small fee is charged to help defray the cost of board and incidental expenses. As a third prize in the State-wide boys' and girls' clubs a week in camp at the college is offered. The third boys' camp is given over to these prize winners, usually 35 to 40 in number. A separate camp, upon a slightly different plan and under different supervision, is held for the girl prize winners of the previous year.

7. Conference on Rural Organization. — This conference is held as a closing feature of the summer school each year. It takes up various problems of New England country life. Numerous State organizations co-operate with the college in providing the programs. Section meetings of various groups are held each forenoon, a general round-table discussion is held each afternoon, and lectures are delivered each evening by persons prominent in social and educational work. Many small group conferences are also arranged. This conference will follow immediately after the summer school.

Correspondence Courses. — The purpose of the correspondence courses is to furnish systematic instruction in those lines which will most benefit the general farmer, the dairyman, the fruit grower, the market gardener, the poultryman, the teacher, the homemaker, and all others who are interested in agricultural and country-life matters. It is the purpose to present up-to-date, accurate and concise information in such a manner and in such language that all who pursue the study may readily understand the work.

*Courses offered.* — A number of courses are in process of revision and several are being rewritten. During 1917 courses will be available as follows: —

1. Soils and Soil Fertility. Assistant Professor Jones.
2. Manures, Fertilizers and Soil Amendments. Assistant Professor Jones.
3. Field Crops. Assistant Professor Jones.
4. Farm Dairying. Professor Lockwood.
5. Fruit Growing. Professor Sears, Associate Professor Chenoweth.
6. Market Gardening. Assistant Professor A. S. Thomson.
7. Animal Feeding. Mr. Turner.
9. Farm Accounts. Professor Foord.
10. Entomology. Dr. Regan.
12. Beekeeping. Associate Professor Gates.
13. Forestry. Professor Clark.
14. Shade Tree Management. Professor Osmun.
17. Poultry Husbandry. Professor Graham.
18. Home Economics. Extension Professor Comstock.
19. Rural Sociology. Professor Phelan.

*Methods of conducting the Work.* — The best known methods of conducting correspondence course teaching are employed. Certain courses are based entirely upon text-books, others consist wholly of typewritten lectures, while others combine the two. If books are not required they are usually recommended.

The courses are designed primarily for the individual student. A new phase of the work, however, is the organization of study clubs or classes, meeting together periodically and using the courses as a basis of study. Correspondence in regard to this work is invited.

*Enrollment of Correspondence Courses.* — Students may enroll in the courses at any time between October 1 and June 1, and one year from the date of registration is allowed for the completion of each course. It has been found advisable to discontinue the courses through the summer months, as farmers and most other students cannot devote the necessary amount of time to the lessons during this season.

*Expenses of the Correspondence Courses.* — In order that none shall enroll except those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at $1 for each course except where the courses are divided, and it has been found advisable to charge $1 for each of the parts in these instances. The fee is payable strictly in advance, at the time the enrollment card is sent. When text-books are required the student purchases these.

MISCELLANEOUS SHORT COURSES. — For certain such courses, see page 150.

LECTURES AND DEMONSTRATIONS. — The members of the faculty of the college are, when other duties will permit, available for lectures and demonstrations before granges, men's clubs, women's clubs, Y. M. C. A.'s, farmers' clubs, boards of trade and other organizations. A list of more than 40 lecturers and 200 subjects on various phases of agriculture, country life, economics, sociology, education, civic betterment and various scientific subjects has been prepared. Full courses of lectures or single lectures may be arranged.

Organizations arranging the lectures are asked to pay the traveling expenses of the lecturer, provided no admission fee is charged. When admission is charged the lecturer is entitled to a fee in addition to traveling expenses.

EXTENSION SCHOOLS. — The extension schools are of two distinct types, the first being the Agricultural Extension School, dealing with the production side of farming and with the problems of the farm home; the second is the Extension School in Community Planning, having to do with the organization and selling end of agriculture, and with instruction in the planning and carrying forward of various community activities.

It is also possible to arrange special extension schools along one particular line of work, such as fruit growing, dairying, etc.

Communities desiring an extension school make a written request, agreeing to defray all local expenses, such as the rent, heating and lighting of a suitable hall, and the board of the instructors during the school.

*Agricultural Extension Schools.* — The college sends a corps of instructors to a town for a five-day school of instruction. At present the following courses are offered: soil fertility, animal husbandry and dairying, fruit growing, poultry husbandry and vegetable gardening for the men, and a homemakers' course for the women. Morning and afternoon sessions only are held.

*Community Planning Extension Schools.* — These schools are arranged to extend over at least three days. The following courses are offered: education, agricultural organization, community program, civic improvement, farm management, town administration, public health, community recreation and homemaking. Morning, afternoon and evening sessions are held in these schools.

EDUCATIONAL EXHIBITS AT FAIRS AND OTHER SHOWS. — The college co-operates with the managers of fairs, industrial expositions, corn shows, poultry shows, fruit shows and other exhibitions by making educational exhibits.

For outside work a large tent has been provided. In this about thirty cabinets containing educational material are arranged. A corps of lecturers and demonstrators accompany the exhibit and give practical instruction daily.

For inside work a space at least 40 by 60 feet is required for this exhibit. Smaller exhibits along special lines are sent to corn, fruit and poultry shows, milk shows, child welfare exhibits, and so forth.

The managers of fairs and exhibits are required to partially meet the cost of presenting these exhibits.

## EXTENSION WORK IN SPECIAL FIELDS.

EXTENSION WORK IN FRUIT GROWING. — This work includes lectures and demonstrations on laying out and planting orchards, pruning, spraying, thinning, grading, packing and marketing fruits. Demonstration orchards, new and renovation plots, are established in different sections of the State, under a co-operative agreement between the college and the owners of land. Extension schools in fruit growing and fruit grading and packing are arranged on request. Visits to farms for advisory work are made, and correspondence on orcharding subjects is invited.

EXTENSION WORK IN ANIMAL HUSBANDRY. — This work includes lectures, demonstrations and advisory assistance on subjects pertaining to cattle, horses, sheep and swine, as well as instruction in barn planning. Assistance in organizing dairy improvement associations and breeders' associations is given; stock-judging contests for boys are arranged at the leading fairs.

EXTENSION WORK IN DAIRYING. — This includes lectures and demonstrations on the handling and care of milk, cream, butter and cheese; Babcock testing, dairy utensils and dairying manufactures. Educational campaigns may be arranged in different communities, seeking to educate producers, dealers and consumers as to the production and distribution of clean, safe milk.

EXTENSION WORK IN POULTRY HUSBANDRY. — In addition to conferences at the college and visits to the plants of poultrymen, advice on general poultry management, diseases, mating, and laying out and planning buildings, this work includes co-operative work with other State and county agricultural and educational organizations, exhibits of poultry appliances at fairs and shows and other incidental phases.

EXTENSION WORK IN FARM MANAGEMENT, FIELD STUDIES AND DEMONSTRATIONS. — This is carried on co-operatively between the college and the office of farm management of the United States Department of Agriculture at Washington. It consists of a study of farm conditions and farm management problems; instruction in keeping farm accounts and growing field crops; the use of fertilizer and lime; advice as to farm equipment, buildings, and so forth.

EXTENSION WORK IN RURAL CIVIC PLANNING. — This is carried on in connection with the Department of Landscape Gardening at the college. Assistance is rendered in various rural and village improvement enterprises, such as the planting and care of shade and street trees, the planning of playgrounds, school grounds, cemeteries, picnic grounds, the beautifying of waterfronts, the rearrangement and development of town commons and reservations of historic interest, and similar activities. Efforts are made to co-operate with local granges, men's and women's clubs, village improvement societies and like organizations.

JUNIOR EXTENSION WORK. — This is an organized effort to promote in the public schools of the State the study of agriculture and practical arts relating to country life. This is accomplished by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children, and lectures before granges, farmers' clubs and other interested organizations. The work of the agricultural clubs is under the direction of the superintendent of schools or some one recommended by him. Each town should hold an annual exhibit of products. Exhibits representing rather extensive districts are incorporated with the various agricultural fairs in the State. In this manner elementary instruction in agriculture is promoted by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College, which in turn co-operates with the State Board and the United States Department of Agriculture.

EXTENSION WORK IN HOME ECONOMICS. — The Extension Service, through its home economics workers, stands ready to assist in solving problems relative to the household in the same manner as it is endeavoring through other workers to aid in working out problems of the farm. The work, among other things, includes lectures and demonstrations, assistance in forming girls' clubs and home economics clubs for women, and co-operation with existing organizations in the matter of interesting young people in the proper care of the home.

LOCAL COMMUNITY ORGANIZATION. — A number of communities in the State have appealed to the college for aid in bringing the various organizations in the community to a higher state of efficiency, in order that they themselves might take definite steps toward community development and advancement. The college is now prepared to make scientific studies of communities which lead up, by means of surveys, to the organization of local committees to study the agricultural, educational, religious, transportation, recreation and civic needs of the communities. Several State organizations and some national organizations are usually brought in to aid in working out the plans presented by these committees. Conferences on community affairs are held upon request. The college acts merely in an advisory capacity, the communities themselves doing the actual organization work.

Library Extension Work. — This consists principally of loaning to public libraries of the State general collections of 10 to 30 books and bulletins on agriculture and related subjects. Special collections of smaller size on specified subjects, such as fruit growing, dairying, poultry, beekeeping, home economics, and so forth, are also sent out. These may be kept from four to eight weeks, according to the demand for them. The only expense to local libraries is transportation charge on the books both ways. The college library also supplies, upon request, information regarding books on agriculture and related subjects.

Agricultural Surveys. — To acquire definite information as to existing conditions in rural communities, to be used as a basis for further extension work, agricultural surveys are made. The different organizations and officials in the community, such as the town officers, superintendent of schools and teachers, clergymen, librarians and others, usually co-operate in making such surveys. The survey covers all phases of community life, including soil survey, farm management practices, and the educational, social, religious and recreational life. The inventory is made upon carefully prepared blanks.

Business Co-operation and Marketing. — This work has for its object the establishment of agriculture on a better business basis. Assistance is given in organization of co-operative buying and selling associations, the securing of rural credit, the adoption of better methods of marketing, the establishment of a better market for agricultural produce, and other lines of agricultural co-operation.

Demonstration Farms and Plots. — Believing that one of the most effective ways of teaching modern farm practice is by the establishment of demonstrations (not experiments) in all sections of the State, thus showing a man on his own land and under his own conditions the result of proper farm practices, the college is placing demonstration plots throughout the State, showing the proper fertilization for grass and other crops, the results of rotations, the proper care of orchards and dairy management. For several years the Faunce Demonstration Farm has been under the advisory direction of the college, as is also the Paige farm at Hardwick. The Faunce farm has proved to the Cape Cod region that small fruit, poultry and vegetables can be successfully grown there. Demonstration farms are usually managed by a committee or board of trustees representing the farm and a committee appointed from the college acting jointly.

County or District Agricultural Agents. — As rapidly as State, government and local funds are available, men trained in agriculture are being assigned to counties and districts of the State to act as agricultural agents. Residents of the county or district may, without cost, call upon the agent for assistance upon any agricultural subject. The work is being partly supported through the co-operation of the United States Department of Agriculture, the college and the community engaging the agent.

Advisory Work with Institutions and Individuals. — Special effort is made to comply with as many of the requests of State institutions and individuals who ask for advice on farm problems as possible. The force of instructors available for this work is at present insufficient to take care of all the demands. Special trips, including visits to a number of the various State institutions, are occasionally made by a group of specialists.

Publications of the Extension Service. — In addition to the regular circulars and bulletins which announce the various short courses and lines of work mentioned, publications giving timely information on agricultural subjects are issued. Large numbers of helpful circulars and bulletins are annually distributed. A series of bulletins especially for the farm woman is one feature of this work. Reports of the work of the Extension Service, dairy record blanks, farm account blanks, boys' and girls' club circulars, lists of books, and so forth, may be had upon request.

Co-operation with Other Organizations. — The aim of the Extension Service is to co-operate with existing organizations so far as possible. It is, therefore, glad to work with local organizations, and welcomes suggestions from town officers, local granges, farmers' clubs, women's clubs, Y. M. C. A.'s, Y. W. C. A.'s, boards of trade, village improvement societies, teachers, clergymen, librarians and others interested in agriculture and country life, as to needs and methods best adapted to the meeting of these needs.

Information by Correspondence. — Besides the activities mentioned, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry, which always receive the most careful attention from every department of the institution.

Pamphlets and bulletins are sent free to all who apply for them, and any who desire such help as has been mentioned should address the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

# GENERAL INFORMATION.

# GENERAL INFORMATION.

## A. FINANCIAL AND ADMINISTRATIVE.

### Student Expenses.

TUITION.[1] — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $60 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.

All students entering the college for the first time as undergraduates or unclassified students are charged a matriculation fee of $5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

DORMITORIES AND BOARD. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present the price of board there is about $5 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

### Expenses.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts, free; other citizens of the United States, $60 a year; foreigners, $120 a year.

| | Low. | High. |
|---|---|---|
| Matriculation fee, first year, | $5 00 | $5 00 |
| Room in college dormitories or in private houses, | 39 00 | 110 00 |
| Board in college dining hall, $5 a week, | 180 00 | 180 00 |
| Laundry, 50 to 85 cents a week, | 18 00 | 30 00 |
| Military uniform, first year, | 17 00 | 17 00 |
| Laboratory fees, | 5 00 | 20 00 |
| Books, stationery and miscellaneous items, | 11 00 | 28 00 |
| | $275 00 | $390 00 |

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[1] This statement applies to those registering as regular or unclassified students.

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $300 and $425 per year.

## Initial Charges.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

| | Freshmen. | Sophomores. | Juniors and Seniors. |
|---|---|---|---|
| Matriculation fee, | $5 00 | – | – |
| Board (if at college dining hall) four weeks in advance, | 20 00 | $20 00 | $20 00 |
| Assessment for support of Social Union, | 1 00 | 1 00 | 1 00 |
| Laboratory fees, | 5 00 | 5 00 | 2 00–10 00 |
| Military uniform,[1] | 17 00 | – | – |
| Room rent (if in college dormitory), | – | – | 12 00–20 00 |
| Student tax for support of athletics,[2] | 8 00 | 8 00 | 8 00 |
| Student tax for support of nonathletic activities,[2] | 2 50 | 2 50 | 2 50 |

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[1] This cost is subject to modification from year to year.

[2] While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

## Laboratory Fees.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present, the fees charged are as follows: —

| Agronomy: — | Per Semester. |
|---|---|
| Course 27, 3, | $1 50 |
| Course 50, 1, | 2 00 |
| Course 51, 3, | 2 00 |
| Course 75, 1, | 1 50 |
| Course 76, 3, | 1 50 |

| | Per Semester. |
|---|---|
| Animal husbandry: — | |
| Course 1, 1 and 2, | $1 00 |
| Course 25, 1, | 1 50 |
| Course 26, 2, | 1 50 |
| Course 50, 2, | 1 50 |
| Course 78, 2, | 1 00 |
| Dairying: — | |
| Course 50, 1, | 2 50 |
| Course 51, 3, | 2 50 |
| Course 75, 2, | 2 00 |
| Course 76, 3, | 3 00 |
| Course 77, 1, | 2 50 |
| Farm administration: — | |
| Course 75, 2, | 1 50 |
| Course 76, 3, | 1 50 |
| Poultry husbandry: — | |
| Course 51, 1, | 2 50 |
| Course 53, 3, | 3 00 |
| Course 55, 3, | 2 50 |
| Course 76, 1, | 2 00 |
| Course 77, 1, | 2 00 |
| Rural engineering: — | |
| Course 25, 1, | 1 50 |
| Course 26, 2, | 1 50 |
| Course 76, 1, | 1 50 |
| Course 77, 2, | 1 50 |
| Course 78, 3, | 1 50 |
| Floriculture: — | |
| Course 50, 1, | 2 50 |
| Course 51, 2, | 2 50 |
| Course 52, 3, | 2 50 |
| Course 53, 1, | 2 50 |
| Course 75, 1, | 2 00 |
| Course 76, 3, | 2 00 |
| Course 77, 2, | 2 50 |
| Course 78, 3, | 2 50 |
| Forestry: — | |
| Course 50, 1, | 2 00 |
| Course 51, 2, | 3 00 |
| Course 75, 1, | 4 00 |
| Landscape gardening: — | |
| Course 50, 1, | 3 00 |
| Course 51, 2, | 3 00 |
| Course 52, 3, | 4 00 |
| Course 76, 2, | 4 00 |
| Course 77, 3, | 4 00 |
| Course 79, 3, | 2 00 |
| Market gardening: — | |
| Course 50, 3, | 2 00 |
| Course 75, 1, | 3 00 |
| Course 76, 2, | 3 00 |
| Pomology: — | |
| Course 75, 1, | 3 00 |
| Course 76, 2, | 3 00 |

Drawing: —

| | Per Semester. |
|---|---|
| Course 25, 1, | $3 00 |
| Course 26, 2, | 3 00 |

Botany: —

| | |
|---|---|
| Course 3, 3, | 3 00 |
| Course 25, 1, | 3 00 |
| Course 26, 2, | 3 00 |
| Course 50, 1, | 3 00 |
| Course 51, 2, | 5 00 |
| Course 52, 1, | 4 00 |
| Course 53, 2, | 4 00 |
| Course 54, 3, | 4 00 |
| Course 55, 1, | 5 00 |
| Course 56, 2, | 5 00 |
| Course 75, 1, | 5 00 |
| Course 76, 2, | 5 00 |
| Course 77, 3, | 5 00 |
| Course 78, 1, | 5 00 |
| Course 79, 3, | 5 00 |
| Course 80, 3, | 5 00 |
| Course 82, 2, | 5 00 |
| Course 83, 3, | 5 00 |
| Course 84, 2, | 5 00 |
| Course 85, 3, | 5 00 |

Entomology: —

| | |
|---|---|
| Course 75, 3, | 2 00 |
| Course 76, 1, | 3 00 |
| Course 77, 2, | 3 00 |
| Course 78, 3, | 3 00 |

Chemistry: —

| | |
|---|---|
| Course 1, 1, | 3 00 |
| Course 2, 2, | 3 00 |
| Course 3, 3, | 3 00 |
| Course 4, 1, | 3 00 |
| Course 5, 2, | 3 00 |
| Course 6, 3, | 3 00 |
| Course 25, 1, | 4 00 |
| Course 26, 2, | 4 00 |
| Course 27, 3, | 5 00 |
| Course 30, 3, | 4 00 |
| Course 51, 1, | 5 00 |
| Course 52, 2, | 5 00 |
| Course 60, 1, | 4 00 |
| Course 61, 2, | 5 00 |
| Course 62, 3, | 5 00 |
| Course 65, 3, | 4 00 |
| Course 76, 1, | 5 00 |
| Course 77, 2, | 5 00 |
| Course 80, 1, | 5 00 |
| Course 90, 2, | 5 00 |
| Course 91, 3, | 5 00 |
| Course 92, 2, | 5 00 |
| Course 93, 3, | 5 00 |
| Course 94, 2, | 5 00 |
| Course 95, 3, | 5 00 |

Mathematics and engineering: —

| | |
|---|---|
| Course 27, 3, | 2 00 |
| Course 78, 3, | 2 00 |

| | Per Semester. |
|---|---|
| Micróbiology: — | |
| Course 51, 2 and 3, | $5 00 |
| Course 52, 3, | 5 00 |
| Course 75, 2, | 5 00 |
| Course 76, 3, | 5 00 |
| Course 80, 2, | 5 00 |
| Course 81, 1, | 5 00 |
| Course 82, 1, | 5 00 |
| Course 83, 1, | 5 00 |
| Physics: — | |
| Course 27, 3, | 3 00 |
| Course 50, 1, | 3 00 |
| Course 51, 2, | 3 00 |
| Course 52, 3, | 3 00 |
| Veterinary science: — | |
| Course 78, 1, | 2 00 |
| Course 79, 1, | 2 00 |
| Course 80, 3, | 2 00 |
| Course 85, 1, | 2 00 |
| Course 86, 2, | 2 00 |
| Course 87, 3, | 2 00 |
| Zoölogy and geology: — | |
| Course 25, 1, | 3 00 |
| Course 27, 3, | 3 00 |
| Course 50, 1, | 3 00 |
| Course 51, 2, | 4 00 |
| Course 52, 3, | 4 00 |
| Course 53, 1, | 4 00 |
| Course 54, 2, | 3 00 |
| Course 55, 3, | 3 00 |
| Course 75, 1, | 3 00 |
| Course 76, 2, | 3 00 |
| Course 77, 3, | 3 00 |
| Rural journalism: — | |
| Course 53, 1, | 2 00 |
| Course 54, 2, | 2 00 |
| Course 55, 3, | 2 00 |
| Course 77, 1, | 2 00 |
| Course 78, 2, | 2 00 |
| Course 79, 3, | 2 00 |
| Course 80, 1, | 2 00 |
| Course 81, 2, | 2 00 |
| Course 82, 3, | 2 00 |
| Music (each course), | 3 00 |

## Student Aid.

SELF HELP. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 and preferably $250 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and sixty or more students are employed at the dining hall.

Application for student labor should be made directly to Kenyon L. Butterfield, president of the college. Applicants are required to present statements from parent or guardian and from a public official or other responsible person of the town or city in which they reside, explaining the necessity of the applicant's need of assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

## Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each term. This rule is strictly adhered to, and no student will be allowed to complete his registration until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each term at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the term he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

## Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the president for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

## Infirmary.

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students: —

### MANAGEMENT OF THE INFIRMARY.

#### *Supervision.*

1. The infirmary is under the *general supervision* of Dr. Charles E. Marshall who is designated as Supervisor of the Infirmary. Miss Florence Levensaler the resident nurse, is in *immediate* charge of the infirmary.

#### *Use of Infirmary.*

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as Professor Hicks gives special attention to all student diseases, it

is to be expected that the majority of the students will go to the infirmary at the suggestion of Professor Hicks. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

### *General Health.*

3. Students are urged to consult Professor Hicks or Miss Levensaler immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

### *General Fee.*

4. The infirmary fee will be at the rate of $1 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. No charge will be made for miscellaneous treatment of a minor character unless the patient receives one or more meals or remains at the infirmary for one or more nights.

### *Additional Expenses.*

5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient: —

(*a*) *Nurses.* — In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(*b*) *Professional Service.* — If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(*c*) *Supplies.* — Special medical supplies prescribed by a physician or nurse will be charged to the patient. No charge will be made for ordinary medical supplies kept in stock at the infirmary and furnished students in minor cases of illness or accident.

(*d*) *Laundry.* — Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

## B. COLLEGE ACTIVITIES.

### General Exercises.

Chapel exercises are held two mornings each week. On Wednesday an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

### Student Activities.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about six years ago. All students become members of the union by paying a small fee. The union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study; in the basement of this building there is also a game room for pool and billiards. In the fall and winter months the union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association is active both socially and religiously. Under its direction voluntary Bible classes are conducted during the winter months. A Catholic club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A dramatic club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and basket-ball.

A rifle club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Massachusetts Collegian," published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture and horticulture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Clubs also exist in the Departments of French, Entomology, Floriculture, Landscape Gardening, Zoölogy and Agriculture Economics.

There has recently been organized a Collegiate Country Life Club, the membership of which is composed of faculty and students who are particularly interested in the study of country life problems.

A nonathletics student activities board, composed of alumni, faculty and students, has charge of the finances, schedules, etc., of the musical clubs, dramatic club and student publications.

## C. ACADEMIC AND DEPARTMENTAL.

### Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

### Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1914 were: —

Agriculture. — The Grinnell prizes, given by Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, for excellence in theoretical and practical agriculture. Three prizes, $25, $15, $10. The contest is open to those senior students whose record on the registrar's books shows an average standing of 80 or above for the technical work taken in the Divisions of Agriculture and Horticulture during the junior and senior years. Applicants should register with the head of the Division of Agriculture before noon June 2, 1917.

Animal Husbandry. — The F. Lothrup Ames prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

Botany. — The Hills prizes, given by Henry F. Hills of Amherst, amount to $35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, $20; for the second best herbarium, $15. No collection deemed unworthy of a prize will be considered.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character and example.

Public Speaking. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

## Equipment.

Agricultural Education. — The courses in this department are planned primarily for those who are preparing to teach. The work is carried on by means of lectures, library and demonstrations. The department has an office, lecture room and a laboratory in the Veterinary Science building. The laboratory is equipped with a balance, dishes, jars, reagent bottles, test tubes, petri dishes, lenses, a Babcock test, a Wisconsin sediment test, Bunsen burner, hot and cold water, electricity, gas and other appliances for giving demonstration and practice lessons in Secondary Agriculture. There is also equipment for conducting children's gardens on the campus. Instruction in school gardens constitutes a part of the practice work of those training for the occupation of teaching. Some practice work in teaching is done in the grammar grades of the Amherst schools, and in the agricultural departments of Hopkins' Academy, and Smith's Agricultural School at Northampton. This department is also intimately related to the matter of recommending candidates for teachers' certificates. At least four courses in the department are required of students preparing for such certificate. The office is supplied with school and college reports, also a large number of pamphlets and bulletins relating to the subject of agriculture in the schools, courses of study, etc. See note relative to teachers' certificates, under major in Agricultural Education.

Agronomy. — The work in agronomy is carried on by means of lecture, laboratory and field work. The soil laboratories are located in the basement of Stockbridge Hall, and include an elementary laboratory with locker equipment for 200 men, and desk space for four divisions of 50 men each, and an advanced soil laboratory for the work of upper classes, with locker space for 80 men. This laboratory is also equipped with balance room, centrifuge room, steam ovens and moisture cabinets. There is also a workroom attached, equipped with power for grinding soils, fodders and the like.

The crop laboratories are located on the second floor of Stockbridge Hall, the room for seed study being at the south end and allowing for sections of 50 men each. The laboratory for cereal and forage crop work is at the north end of the building, and has locker equipment for 64 men. This laboratory is equipped with large steam ovens, constant temperature electric ovens, Brown-Duval moisture apparatus and ovens for seed germination. Attached is a balance room and also a storeroom; while on the fourth floor of Stockbridge Hall is a room equipped for the storage of seed corn, grains and grasses.

Animal Husbandry. — An accurate and definite knowledge of the market types and grades, and of the various breeds of live stock, is fundamental to the work in this department. The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180, and which is fully adapted to the requirements. There are upwards of 125 head of dairy cattle of various ages available for class-room work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Yorkshire pigs are maintained. The college possesses pure-bred Percherons and French coach horses, besides many work teams of different types, which are available for class-room purposes. A set of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different foodstuffs available for the use of the New England farmer, are included in the equipment for this work. An excellent set of upward of 250 lantern slides, portraying the leading prize-winning, producing and breeding animals of the leading breeds, — horses, cattle, sheep and swine, — belongs to this department, and is regularly used in instructional work. This equipment is being added to from time to time as funds are available.

BOTANY. — The Department of Botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for freshman and sophomore work, and one for junior and senior work; a laboratory for plant physiology, which is well supplied with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc.; and three rooms specially fitted for graduate students. The experiment-station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experimental work and for housing material often needed for instruction.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with modern compound microscopes, dissecting microscopes, microtomes and other apparatus, and a large series of charts. In addition to a physiological laboratory the basement contains a seed and soil room, and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe and other tools and appliances. The herbarium contains about 18,000 sheets of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and over 20,000 specimens of fungi.

CHEMISTRY. — The college Department of Chemistry occupies the entire building previously known as the "old chapel." The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to organic, physiological and physical chemistry, and qualitative analysis. The second floor is occupied by the general lecture room, by offices for the several members of the staff and by laboratories for analytical chemistry. The third floor has been fitted for work in general chemistry, and has desk room and hoods sufficient to accommodate 66 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 100 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

DAIRYING. — The dairy work is given in Flint Laboratory, a new building designed for the dairy department. It contains large, well-lighted, sanitary and well-equipped laboratories. The equipment is new and of the best types of market milk and farm dairy machines.

DINING HALL. — Draper Hall, a brick colonial building equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college. The building contains a limited number of rooms for young women students.

DRAWING. — The class in drawing occupies a room on the second floor of Wilder Hall. It is equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — *General Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped, and it will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room chemical desks and apparatus provide opportunities for the determination of the impurities and adulterations of insecticides. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

ENTOMOLOGY. — *Beekeeping.* — For this work the main office, museum and lecture rooms are in the entomological building. There is also an apiary covering approximately two acres which will consist of about fifty colonies of bees in various types of hives and maintained for the several practical and experimental purposes. The apiary also includes a collection of nectar-yielding plants representative of the native flora as well as of the more important nectar sources from other localities. Especial opportunity is therefore given for a study of this fundamental problem of forage. Upon the apiary site is an eight-room building (the first in the world erected exclusively for teaching beekeeping) modeled to meet both the requirements of teaching and of a practical apiary. This building contains a boiler room, capacious wintering cellar, wax extraction room, general carpenter and work shop, laboratory, office, honey extraction room and stock room. The beekeeping equipment also includes an unexcelled collection of apicultural implements, natural history specimens and other curiosities. Practically every device used in American apiculture is available, it being the aim of the department to procure new inventions and implements as fast as they appear for the purpose of study and comparison. Available to the students is a private library of apicultural literature consisting of upwards of 900 volumes and papers, possibly the most complete collection in the country. This entire equipment is acknowledged unique in model and in completeness for the United States and for the world.

Farm Administration. — The college farm of 250 acres is under the general supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

Floriculture. — The Department of Floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a Department of Floriculture better equipped than this. There has been erected a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The Department of Forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distances of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects. The recent designation of Mt. Toby as a forest reservation provides more than 700 acres of forest, representing nearly every forest growth within the State.

GEOLOGY. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes. The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop and well-equipped carpenter shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library — stack room, reading room and office — occupies the entire lower floor of the Chapel-library building. It contains about 53,000 volumes and a large number of bulletins, farm papers and other material, which is being put into good working order as fast as possible. Works on agriculture, horticulture, botany, entomology and the various sciences predominate, but literature, history and sociology are well represented and receive due attention. The reading room provides a good variety of popular and technical periodical literature, encyclopedias and general reference books.

The library is being reclassified and recatalogued in order to make the splendid material accessible and of the greatest working value. Every effort is being made toward developing the college library into a vital intellectual center, of equal value to every student, teacher and teaching department on the college campus. Consequently only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced. An agricultural reference library is maintained in Stockbridge Hall, and department libraries are also maintained in some of the other buildings on the campus.

Occasional lectures are given to regular and short-course students in order to make the best use of the library equipment. Emphasis is laid upon the card catalogue, periodical indexes, bibliographies and guides, and the large collections of United States Department of Agriculture and experiment station literature.

Library hours are from 7.30 A.M. to 9.30 P.M. every week day except Monday and Friday mornings, when the library is open at 8 o'clock, and from 9 A.M. to 1.30 P.M. on Sundays in term time. Shorter hours prevail during vacation.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and laboratory particularly equipped for market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

MICROBIOLOGY. — The department now occupies a newly erected building and has at command laboratories, research rooms, offices and class-rooms, of thoroughly modern completeness.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The main floor is used for basket ball, indoor baseball and hand ball. The gallery has been fitted up as a special exercise and gymnastic room, and is equipped with modern developing apparatus, including parallel bars, horses, bucks, chest weights, dumb-bells, Indian clubs and striking bags. An outdoor board track enables students to secure track practice through the winter, and two ice hockey rinks give ample opportunity for hockey practice. Credit is given to all students taking part in outdoor activities. "Treks" are held twice a week, and whenever possible snowshoe and skiing hikes are also held. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a shower-room. The gymnasium classes are held the last two hours in the morning and the last two hours in the afternoon, but students may use the gymnasium at other times for exercise purposes by arrangement with the department. The regulation costume for class exercise consists of a white track suit and white rubber-sole shoes.

PHYSICS. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

POMOLOGY. — The Department of Pomology has 45 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There are also two commercial vineyards, and a smaller one in which are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples, plums, pears and peaches, in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1912–13, for instance, apples for class use were received from Idaho, Missouri, Utah, Washington, Maine, Connecticut, Pennsylvania, Montana, Minnesota, Nebraska, Kentucky, Iowa, Wisconsin, Michigan, New York, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrus fruit from Florida and Texas. From the college fruit plantations the following fruits were available: grapes, fifty varieties, representing three native American species and several hybrids; twenty varieties of peaches, twenty varieties of pears, twenty-five varieties of plums, eighty varieties of apples.

POULTRY HUSBANDRY. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar, 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, cramming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; a combination laying, testing and breeding house, 18 by 72, for experimental purposes, and a model laying house, 18 by 30, for 100 hens; the 6 old experiment-station buildings, each 12 by 18 feet, to be used as breeding houses; 14 colony houses; 8 growing crops; a manure shed, 14 by 18 feet; and an oil house, 10 by 12 feet. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chickens, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

Public Speaking. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests offer a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollegiate contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

Rural Engineering. — This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings. A set of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The rural engineering shop building is a one-story structure 68 by 126 feet. The carpenter shop in this building is fitted with benches fully equipped with tools for each student. A saw table is available for getting out material. The general repair shop is equipped with forges, benches, a drill press and grinders. The laboratory for farm machinery and farm motors is equipped with a complete line of field machines, gasoline engines and pumps. A small dynamo and switchboard are used in the study of farm-lighting systems.

The work on the small field machines is given in the basement of Stockbridge Hall, and the work on steam engines and steam heating is given in Flint Laboratory.

Rural Journalism. — The news-room, or laboratory, for the courses in rural journalism, is equipped with typewriting machines, copy tables, representative newspapers, reviews, agricultural papers, and trade journals concerning journalism and writing, selected books on journalism, reference books, and a considerable "morgue" of indexed pamphlets, monographs and clippings on farming, rural life and rural industry, contemporary events, etc. (loan collection). The news-room and offices are in the recently completed Stockbridge Hall, near the division library of the Division of Agriculture.

Veterinary Science. — The Department of Veterinary Science occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the Departments of Entomology and Zoölogy-Geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 3 floor cases with space for 9 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 p.m. on Saturdays, and on other week days from 3 to 6 p.m. The curator is Associate Professor Gordon.

## List of Awards and Prizes, 1916.

Grinnell Prizes. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, $25, awarded to Harold Augustus Mostrom.

Second prize, $15, awarded to Ralph Fred Taber.

Third prize, $10, awarded to Raymond Alson Mooney.

GENERAL IMPROVEMENT. — The Western Alumni Association prize, given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example, $25. Awarded to Ralph Walter Hurlburt, 1918.

HILLS BOTANICAL PRIZES. — Hills prizes for the best and second best herbarium, competition open to members of the senior, junior and sophomore classes, were awarded as follows: —

First prize of $20 to Roger Francis Clapp of the sophomore class.

Second prize of $15 to Carlton McIntyre Stearns of the junior class.

PUBLIC SPEAKING. — The Burnham prizes were awarded to the students delivering the best and second best declarations, as follows: —

First prize, $15, awarded to Henry John Burt, 1919.

Second prize, $10, awarded to Fred Bucknam Sampson, 1918.

The Flint prizes were awarded to the students delivering the best and second best orations, as follows: —

First prize, $20, awarded to Theodore Henry Reumann, 1918.

Second prize, $15, awarded to Lincoln David Kelsey, 1917.

*Interclass Debate.* — Won by the Freshman Debating Team, composed of Robert Burleigh Collins, James Joseph Window and Henry John Burt, — silver cup to each.

*College Prize Debate.* — Lincoln David Kelsey, 1917, Henry John Burt, 1919, and Thomas Lincoln Harrocks, 1916, — $15 to each.

MILITARY HONORS. — The following-named cadet officers have been granted the military diploma, and have been reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts as being efficient in military science and tactics and graduating therein with highest honors: —

Cadet Col. Charles Edward Hathaway, Jr.
Cadet Maj. Albert James Hicks.
Cadet Maj. Charles Albert Huntington, Jr.
Cadet Capt. Harold Aiken.
Cadet Capt. Emilio Joseph Cardarelli.
Cadet Capt. George Newlon Danforth.
Cadet Capt. Frank Eugene Haskell.
Cadet Capt. Stanley Marshall Prouty.
Cadet Capt. Everett Stackpole Richards.
Cadet Capt. Dean Albert Ricker.
Cadet Capt. Benjamin Charles Louis Sander.
Cadet Capt. Raymond Scott Wetherbee.

RURAL DRAMA PRIZE. — A prize of $50 was offered jointly by Prof. E. L. Morgan and the Dramatic Society for the best rural drama produced by a member of the undergraduate student body. Awarded to Mr. Thomas Carlton Upham of the class of 1916.

## Secretaries of Alumni Associations.

Associate Alumni of the Massachusetts Agricultural College.
*Secretary:* Dr. Charles A. Peters, 1897, Amherst, Mass.

Alumni Secretaries' Association of the Massachusetts Agricultural College.
*Secretary:* Ralph J. Watts, 1907, Amherst, Mass.

Alumni Club of Massachusetts.
*Secretary:* Edward C. Edwards, 1914, 50 State Street, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
*Secretary:* Robert S. Fay, 1913, Monson, Mass.

Massachusetts Agricultural College Club of New York.
*Secretary:* Dr. John Ashburton Cutter, 1882, 266 West Seventy-seventh Street, New York City.

Massachusetts Agricultural College Club of Washington, D. C.
*Secretary:* G. A. Billings, U. S. D. A., Office of Farm Management, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
*Secretary:* Charles A. Tirrell, 1906, 815 Steinway Hall, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
*Secretary:* Thomas F. Hunt, 1905, Berkeley, Cal.

Massachusetts Agricultural College Club of Hawaii.
*President:* Allen M. Nowell, 1897, Honolulu, T. H.

Massachusetts Agricultural College Club of Worcester County.
*Secretary:* Charles H. White, 1909, 11 Foster Street, Worcester, Mass.

Massachusetts Agricultural College Club of Marlborough.
*Secretary:* William L. Howe, 1908, Marlborough, Mass.

Massachusetts Agricultural College Club of Connecticut.
*Secretary:* Herbert J. Baker, 1911, Storrs, Conn.

## *Class Secretaries.*

| Class of — | Secretary. | Secretary's Address. |
|---|---|---|
| 1871 | E. E. Thompson, | 5 Jacques Avenue, Worcester, Mass. |
| 1872 | F. E. Kimball, | 17 Harvard Street, Worcester, Mass. |
| 1873 | C. Wellington, | Amherst, Mass. |
| 1874 | D. G. Hitchcock, | Warren, Mass. |
| 1875 | P. M. Harwood, | Room 136, State House, Boston, Mass. |
| 1876 | C. Fred Deuel, | Amherst, Mass. |
| 1877 | Atherton Clark, | 231 Waverley Avenue, Newton, Mass. |
| 1878 | C. O. Lovell, | 201 Darke Block, Regina, Saskatchewan, Can. |
| 1879 | R. W. Swan, | 41 Pleasant Street, Worcester, Mass. |
| 1880 | Alvan L. Fowler, | 413 Federal Building, Philadelphia, Pa. |
| 1881 | J. L. Hills, | 59 North Prospect Street, Burlington, Vt. |
| 1882 | G. D. Howe, | 38 Whittier Avenue, Springfield, Mass. |
| 1883 | J. B. Lindsey, | Amherst, Mass. |
| 1884 | E. A. Jones, | New Canaan, Conn. |
| 1885 | E. W. Allen, | 1923 Biltmore Street, Washington, D. C. |
| 1886 | Winfield Ayres, | 616 Madison Avenue, New York City. |

*Class Secretaries* — Concluded.

| Class of — | Secretary. | Secretary's Address. |
|---|---|---|
| 1887 | F. H. Fowler, | Shirley, Mass. |
| 1888 | H. C. Bliss, | 14 Mechanic Street, Attleboro, Mass. |
| 1889 | F. W. Davis, | 85 Colberg Avenue, Roslindale, Mass. |
| 1890 | David Barry, | 398 Walnut Street, Newtonville, Mass. |
| 1891 | H. T. Shores, | 177 Elm Street, Northampton, Mass. |
| 1892 | H. M. Thomson, | Amherst, Mass. |
| 1893 | F. A. Smith, | Hathorne, Mass. |
| 1894 | S. F. Howard, | Northfield, Vt. |
| 1895 | E. A. White, | Ithaca, N. Y. |
| 1896 | A. S. Kinney, | South Hadley, Mass. |
| 1897 | C. A. Peters, | Amherst, Mass. |
| 1898 | W. S. Fisher, | Peace Street Grammar School, Providence, R.I. |
| 1899 | Herbert W. Dana, | 9 Oliver Street, Salem, Mass. |
| 1900 | E. K. Atkins, | 15 Hubbard Avenue, Northampton, Mass. |
| 1901 | J. H. Chickering, | Dover, Mass. |
| 1902 | H. L. Knight, | 1420 Buchanan Street, Washington, D. C. |
| 1903 | G. D. Jones, | North Amherst, Mass. |
| 1904 | P. F. Staples, | East Holliston, Mass. |
| 1905 | A. D. Taylor, | 1900 Euclid Avenue, Cleveland, Ohio. |
| 1906 | Richard Wellington, | 2314 Scudder Street, St. Paul, Minn. |
| 1907 | Clinton King, | 31 Elm Street, Springfield, Mass. |
| 1908 | S. J. Wright, | 39 Wall Street, Norwalk, Conn. |
| 1909 | O. B. Briggs, | 1011 Fidelity Building, Baltimore, Md. |
| 1910 | F. L. Thomas, | Auburn, Ala. |
| 1911 | L. M. Johnson, | Newtown, Conn. |
| 1912 | F. S. Madison, | East Greenwich, R. I. |
| 1913 | B. W. Ellis, | 575 Main Street, South Weymouth, Mass. |
| 1914 | L. Ernest Smith, | Pittsford, Vt. |
| 1915 | P. F. Whitmore, | Sunderland, Mass. |
| 1916 | Perez Simmons, | 34 Boylston Street, Pittsfield, Mass. |

# DEGREES CONFERRED AND ROLL OF STUDENTS.

# DEGREES CONFERRED — 1916.

### Doctor of Philosophy (Ph.D.).

Chapman, George Henry, Amherst, Mass., Massachusetts Agricultural College, M.Sc.
Itano, Arao, Okayamakan, Japan, Michigan Agricultural College, B.Sc.
Ruprecht, Rudolph W., Flatbush, N. Y., Massachusetts Agricultural College, M.Sc.

### Master of Science (M.Sc.).

Armstrong, Robert Pierson, Rutherford, N. J., Massachusetts Agricultural College, B.Sc.
Beals, Carlos Loring, Sunderland, Mass., Massachusetts Agricultural College, B.Sc.
Lund, Russell Fort, Amherst, Mass., St. Lawrence University, A.B.
Serex, Paul, Jr., Bloomfield, N. J., Massachusetts Agricultural College, B.Sc.
Thurston, Arthur Searle, Everett, Mass., Massachusetts Agricultural College, B.Sc.

### Bachelor of Science (B.Sc.).

| | |
|---|---|
| Aiken, Harold, | Millis. |
| Anderson, Frank Albert, | Somerville. |
| Andrews, Francis Marshall, Jr., | Manchester. |
| Barnes, Dwight Fletcher, | Bedford. |
| Barnes, Fred Leslie Walker, | Plymouth. |
| Bishop, Herbert Walker, | Doylestown, Pa. |
| Blanpied, Nelson Uhler, | Framingham. |
| Boyer, Edward Everett Hale, | Lynn. |
| Brazil, William Henry, | Leominster. |
| Caldwell, Harold Nute, | Lowell. |
| Cardarelli, Emilio Joseph, | Boston. |
| Chase, Esther Helen, | Holden. |
| Chisholm, Raymond Lincoln, | Melrose Highlands. |
| Clapp, Raymond Luckey, | Northfield. |
| Clark, Saxon Dickinson, | Springfield. |
| Coe, Alfred Lynn, | Fayetteville, N. Y. |
| Coleman, Albert Sumner, | Mendon. |
| Coley, William Stanton, | Wilton, Conn. |
| Courchene, Alcide Telesphor, | North Adams. |
| Curran, Harry Ambrose, | Marlborough. |
| Danforth, George Newlon, | Foxcroft, Me. |
| Darling, Homer Chester, | Mendon. |
| Davis, Frank Leslie, | Milford. |
| Dickinson, William Cowls, | North Amherst. |
| Dodge, Walter Eugene, | Geneva, Ohio. |
| Eldredge, Raymond Chase, | North Abington. |
| Estes, Ralph Cary, | South Framingham. |
| Fernald, Charles Henry, 2d, | Amherst. |
| Fielding, Lester Edward, | Malden. |
| Gaventa, Harry Reymer, | Swedesboro, N. J. |
| Gilmore, Benjamin Anthony, | Acushnet. |
| Gioiosa, Alfred Anthony, | Dorchester. |
| Glover, Theodore Whitford, | South Duxbury. |
| Goodwin, Clinton Foster, | Haverhill. |
| Googins, Burton, | Jersey City, N. J. |
| Gould, Charles Holt, | Hubbardston. |
| Gunn, Carlton Merrick, | Sunderland. |
| Hager, Clayton Marden, | Somerville. |

| | |
|---|---|
| Hall, Stanley William, | Saxonville. |
| Harris, William Lombard, Jr., | Deerfield. |
| Harrocks, Thomas Lincoln, | Westminster. |
| Hart, Reginald, | Montague City. |
| Haskell, Frank Eugene, | Northborough. |
| Hathaway, Charles Edward, Jr., | Somerset. |
| Hemenway, Justin Stanley, | Williamsburg. |
| Hendry, Arthur Ekman, | Milton. |
| Hicks, Albert James, | Amherst. |
| Holden, Mae Faustina, | Royalston. |
| Huntington, Charles Albert, Jr., | Poquonock, Conn. |
| Jerome, Fred William, | Stockbridge. |
| Jones, Linus Hale, | Milford. |
| Jordan, Perley Balch, | Topsfield. |
| Kelly, Harold Russell, | Haverhill. |
| Kilbon, Ralph Gillette, | Springfield. |
| King, Edward Lee, | Norwood. |
| Knapton, Guy Lord, | Lawrence. |
| Laird, Kenneth Bradford, | Brockton. |
| Lieber, Conrad Hugo, | Jamaica Plain. |
| Lindquist, Albert Evert, | Roxbury. |
| Little, Harold Greenleaf, | Newburyport. |
| Locke, Wilbur Trow, | Lawrence. |
| Mahan, Harold Butterworth, | Manchester, N. H. |
| Mattoon, Harold Gleason, | Pittsfield. |
| Mooney, Raymond Alson, | Plattsburgh, N. Y. |
| Moses, Charles Wicker, | Ticonderoga, N. Y. |
| Mostrom, Harold Augustus, | North Middleborough. |
| Murphy, John William, | Beverly. |
| Nash, Clayton Wells, | South Weymouth. |
| Nicholson, James Thomas, | Leominster. |
| Palmer, George Bradford, | Brookline. |
| Perry, Edgar Adams, | Attleboro. |
| Plaisted, Philip Asbury, | Arlington. |
| Potter, David, | Concord. |
| Prouty, Stanley Marshall, | North Brookfield. |
| Ray, George Burrill, | Hingham. |
| Rich, Gilbert Warren, | Hingham. |
| Richards, Everett Stackpole, | Hatfield. |
| Ricker, Dean Albert, | Worcester. |
| Rogers, Tyler Stewart, | Framingham. |
| Rowe, Louis Victor, | Melrose. |
| Russell, Ernest Samuel, | South Hadley. |
| Ryan, William Edward, Jr., | Stoughton. |
| Sander, Benjamin Charles Louis, | Cambridge. |
| Sanderson, Everett Shovelton, | Centreville, R. I. |
| Scheufele, Frank Joseph, | South Natick. |
| Schlotterbeck, Lewis. | Roxbury Station, Conn. |
| Simmons, Perez, | Pittsfield. |
| Stearns, Frederick Campbell, | Waltham. |
| Strauss, Abraham, | Roxbury. |
| Swan, Durelle, | Dorchester. |
| Taber, Ralph Fred, | Cooperstown, N. Y. |
| Taft, Richard Craig, | Oxford. |
| Topham, Alfred, | Lawrence. |
| Upham, Thomas Carlton, | Fitchburg. |
| Verbeck, Howard Graves, | Malden. |
| Walkden, Herbert Halden, | Westford. |
| Walker, Henry Marshall, | Brookline. |
| Wentworth, Everett Lawrence, | East Dover, Vt. |
| Wetherbee, Raymond Scott, | Waltham. |
| Whitney, Leon Fradley, | Brooklyn, N. Y. |
| Wildon, Carrick Earl, | Melrose Highlands. |
| Woolley, Harold Curtis, | Malden. |

# ROLL OF STUDENTS.

## GRADUATE STUDENTS.[1]

| | |
|---|---|
| Alden, Charles H.,<br>B.Sc., Massachusetts Agricultural College. | Amherst. |
| Armstrong, Robert Pierson,<br>B.Sc., Massachusetts Agricultural College.<br>M.Sc., Massachusetts Agricultural College. | Rutherford, N. J. |
| Avery, Roy Crowdy,<br>B.Sc., Connecticut Agricultural College. | New York City. |
| Bain, E. S.,<br>B.S.Ag., Purdue University. | Martinsville, Ind. |
| Bales, Harold C.,<br>A.B., Dartmouth College. | South Deerfield. |
| Beebe, Paul,<br>A.B., Albion College. | Ithaca, Mich. |
| Bemis, Willard G.,<br>B. Sc., Massachusetts Agricultural College. | North Brookfield. |
| Bourne, Arthur Israel,<br>A.B., Dartmouth College. | Amherst. |
| Bronson, Wesley Hotchkiss,<br>B.Sc., New York State College of Agriculture. | Amherst. |
| Caruthers, John T.,<br>B.Sc., Massachusetts Agricultural College. | Nashville, Tenn. |
| Chapin, Edward Albert,<br>Ph.B., Sheffield Scientific School. | Springfield. |
| Clapp, Raymond K.,<br>B.Sc., Massachusetts Agricultural College. | Easthampton. |
| Cobb, J. Stanley,<br>B.Sc., Cornell University. | Groton, N. Y. |
| DeVault, Samuel Henry,<br>A.B., Caron Newnan College.<br>A.M., University of North Carolina. | Jonesboro, Tenn. |
| Dickinson, William Cowls,<br>B.Sc., Massachusetts Agricultural College. | Amherst. |
| Doran, William Leonard,<br>B.Sc., Massachusetts Agricultural College. | North Dartmouth. |
| Drain, Harry D.,<br>B.S.A., Ohio State University. | Belpre, Ohio. |
| Etter, Art Edward,<br>A.B., University of Wisconsin. | Monroe, Wis. |
| Fernald, Charles H., 2d,<br>B.Sc., Massachusetts Agricultural College. | Amherst. |
| Fish, Ernest Ellsworth,<br>B.Sc., Pennsylvania State College. | Wyalusing, Pa. |
| Fletcher, Arthur George,<br>A.B., Harvard. | Orleans, Vt. |
| Hood, Egerton Gibson,<br>B.S.A., Toronto University. | Hagermon, Ontario, Can. |

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[1] Enrollment from September, 1916, to January, 1917, inclusive. The list therefore does not represent the complete enrollment since Dec. 1, 1915.

| | |
|---|---|
| Hubert, Benjamin F.,<br>B.Sc., Massachusetts Agricultural College. | Orangeburg, S. C. |
| Jones, Linus H.,<br>B.Sc., Massachusetts Agricultural College. | Milford. |
| Kelly, Harold R.,<br>B.Sc., Massachusetts Agricultural College. | Haverhill. |
| Kilham, Austin D.,<br>A.B., Drury College.<br>B.Sc. in agriculture, University of Missouri. | Springfield, Mo. |
| Knapton, Guy Lord,<br>B.Sc., Massachusetts Agricultural College. | Lawrence. |
| MacNeil, Ralph Langdel,<br>B.Sc., Massachusetts Agricultural College. | Amherst. |
| Mardfin, Emile,<br>B.Sc., Cornell University. | New York City. |
| McNamara, M. J.,<br>M.Sc., Massachusetts Agricultural College. | Stoughton. |
| Merkle, Frederick Grover,<br>B.Sc., Massachusetts Agricultural College. | Amherst. |
| Morgan, Ezra L.,<br>A.B., McKendree College.<br>M.A., University of Wisconsin. | Amherst. |
| Mutkekar, Satwaji Gundoji,<br>B.Agr., Poona Agricultural College. | Belgaum, Ind. |
| Nash, Clayton W.,<br>B.Sc., Massachusetts Agricultural College. | South Weymouth. |
| Noyes, Henry Alford,<br>B.Sc., Massachusetts Agricultural College.<br>M.Sc., Massachusetts Agricultural College. | Lafayette, Ind. |
| Pauley, William C.,<br>B.Sc. in agriculture, Purdue University. | Lafayette, Ind. |
| Peacock, Walter Miller,<br>B.S., Cornell University.<br>M.S.A., Cornell University. | Bridgeton, N. J. |
| Peckham, Curtis,<br>B.Sc., Massachusetts Agricultural College. | New Bedford. |
| Perry, Gerald Eugene,<br>B.Sc., Massachusetts Agricultural College. | Amherst. |
| Porter, Bennet Allen,<br>B.Sc., Massachusetts Agricultural College. | Amherst. |
| Prince, Arthur Leslie,<br>A.B., Clark College. | Webster. |
| Purington, James A.,<br>B.Sc., New Hampshire College of Agriculture. | Hopkinton, N. H. |
| Ray, George Burrill,<br>B.Sc., Massachusetts Agricultural College. | Hingham. |
| Root, Irving C.,<br>B.Sc., Kansas State Agricultural College. | Kansas City, Kan. |
| Rutledge, Ralph M.,<br>B.Sc., Oregon Agricultural College.<br>M.S., University of Wisconsin. | Amherst. |
| Serex, Paul, Jr.,<br>B.Sc., Massachusetts Agricultural College.<br>M.Sc., Massachusetts Agricultural College. | Bloomfield, N. J. |
| Stewart, Lloyd L.,<br>B.Sc. in agriculture, Purdue University. | Darlington, Ind. |
| Thompson, W. Bradley,<br>A.B., Williams College. | Orange, N. J. |
| Vinal, Stuart C.,<br>B.Sc., Massachusetts Agricultural College. | East Weymouth. |
| Wheeler, John T.,<br>B.S.A., University of Wisconsin. | Amherst. |

White, Donald, . . . . . . . . . . . . Wakefield.
A.B., Harvard College.
White, Henry Harrison, . . . . . . . . . . Amherst.
B.Sc., Massachusetts Agricultural College.
Wies, Calmy, . . . . . . . . . . . Malden.
B.Sc., Massachusetts Agricultural College.
Wildon, Carrick E., . . . . . . . . . . Melrose Highlands.
B.Sc., Massachusetts Agricultural College.
Wood, Elwin G., . . . . . . . . . . . Bigfork, Mont.
B.Sc., Washington State College.
Woodman, Allison Morris, . . . . . . . . . Berkeley, Cal.
B.Sc. in agriculture, University of California.

*In Absentia.*

Davies, Ernest Langford, . . . . . . . . . Guelph, Can.
B.Sc., Ontario Agricultural College.
Fletcher, Arthur George, . . . . . . . . . Orleans, Vt.
A.B., Harvard College.
Noyes, Harry Alfred, . . . . . . . . . . Lafayette, Ind.
B.Sc., Massachusetts Agricultural College.
M.Sc., Massachusetts Agricultural College.

### CLASS OF 1917.

| | | |
|---|---|---|
| Babcock, Philip Rodney,[1] | Lynn, | Kappa Sigma. |
| Behrend, Oswald, | Natick, | Commons Club. |
| Bell, Alfred Whitney, Jr., | West Newton, | 53 Lincoln Avenue. |
| Boles, Robert Stewart, | Dorchester, | Beta Kappa Phi. |
| Bonn, Wesley Copeland, | Grafton, | Commons Club. |
| Booth, Alfred, | Campbell Hall, N. Y., | 12 South College. |
| Boyce, Harold Prescott,[1] | Haverhill, | 14 South College. |
| Buckman, Lewis Taylor, | Wilkes-Barre, Pa., | 13 South College. |
| Buttrick, David Herbert, | Arlington, | Phi Sigma Kappa. |
| Carruth, Glenn Howard,[1] | Orange, | 3 North College. |
| Chamberlin, Frank Shirley, | Framingham, | 18 Nutting Avenue. |
| Clough, Charles Henry, | Dedham, | 11 North College. |
| Cross, Walter Irving, | Hingham Center, | 6 North College. |
| Curtin, Charles Warren, | Newton, | 10 Hallock Street. |
| Davis, Monsell Henry, | Orange, N. J., | 16 North College. |
| Day, James Harold, | Hatfield, | 85 Pleasant Street. |
| Dempsey, Paul Wheeler, | Dorchester, | 15 North College. |
| Dickey, Harold Gammell, | Dorchester, | 8 South College. |
| Dillon, Thomas Stevenson,[1] | West Warren, | Aggie Inn. |
| Dizer, John Thomas, | East Weymouth, | East Experiment Station. |
| Duffill, Edward Stanley, | Melrose Highlands, | 8 Allen Street. |
| Dunham, Henry Gurney, | West Bridgewater, | 11 North College. |
| Edwards, Francis Gill,[1] | Beverly, | Phi Sigma Kappa. |
| Elliot, Ralph William, | Chartley, | Flint Laboratory. |
| Everbeck, George Charles,[1] | Boston, | 1 South College. |
| Fearing, Ralph Watson, | Dorchester, | 3 North College. |
| Flagg, Wayne McCrillis, | Mittineague, | Beta Kappa Phi. |
| Flint, Oliver Simeon, | Lowell, | 120 Pleasant Street. |
| Goldstein, Maurice, | Lynn, | 10 North College. |
| Graham, Leland Jenkins, | Amherst, | Lincoln Avenue. |
| Grayson, Emory Ellsworth,[1] | Milford, | Alpha Sigma Phi. |
| Gurshin, Carl Alfred, | Lynn, | Kappa Sigma. |
| Hagelstein, Charles Henry, | Dorchester, | 14 South College. |
| Harlow, Frank Edward,[1] | Malden, | 10 North College. |
| Harlow, Paul Goodhue, | Malden, | Phi Sigma Kappa. |
| Henninger, Roswell Woodward, | Williamsport, Pa., | 87 Pleasant Street. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Higginbotham, Harry, | Taunton, | 3 South College. |
| Hill, Edmund Baldwin, | Rutherford, N. J., | Alpha Sigma Phi. |
| Holden, Richard Lynde, | Haverhill, | 11 South College. |
| Holder, Ralph Clifton, | Farmington, N. H., | 17 Kellogg Avenue. |
| Hubbell, Franklin Homer, | Westport, Conn., | 14 South College. |
| Irving, William Raymond, | Taunton, | 13 South College. |
| Kelsey, Edmund Dean,[1] | Amherst, | Commons Club. |
| Kelsey, Lincoln David, | West Hartford, Conn., | 90 Pleasant Street. |
| Kinsman, Alfred Oberlin, Jr., | Merrimac, | Mathematics Building. |
| Larson, Frederick Christian,[1] | Everett, | 12 South College. |
| Latham, Paul Walker, | Norwichtown, Conn., | 12 North College. |
| Lawrence, Milford Robinson, | Falmouth, | Kappa Sigma. |
| Light, Brooks,[1] | Brookline, | 4 South College. |
| Loring, Albert Briggs, | Nantasket Beach, | 16 North College. |
| Lydiard, Harry Crowther, | Hartford, Conn., | Colonial Inn. |
| Mack, Walter Adams, | Springfield, | 15 South College. |
| MacLeod, Daniel Johnston,[1] | Wakefield, | Hillside Avenue, R. F. D. No. 126. |
| Marchant, Horace Greenough, | Cambridge, | 5 North College. |
| Mayo, Frank Willard,[1] | Houlton, Me., | Phi Sigma Kappa. |
| Mayo, William Irving, Jr., | Framingham Center, | Experiment Station Farm House. |
| McNamara, Michael Joseph,[1] | Stoughton, | Stockbridge Hall. |
| Merrill, Dana Otis, | East Pepperell, | 10 North College. |
| Moorhouse, Newell, | Worcester, | 9 South College. |
| Nash, Herman Beaman, | Amherst, | 13 North College. |
| Nelson, John Brockway, | Newburyport, | 15 South College. |
| Noyes, Samuel Verne, | Georgetown, | 11 North College. |
| Pierce, Harold Barnard, | Kansas City, Mo., | 80 Pleasant Street. |
| Pratt, Harold Arthur, | Shrewsbury, | M. A. C. Plant House. |
| Quimby, Charles Frederick, | Cape Neddick, Me., | 83 Pleasant Street. |
| Randall, Earle MacNeill, | Winchester, | 11 South College. |
| Richardson, Lewis Elmer, | Rockville, | 11 South College. |
| Rodger, Raymond Miller,[1] | Everett, | 16 South College. |
| Rogers, Roland Winsor, | Braintree, | 12 South College. |
| Rorstrom, Hans Alfred, | Boston, | Experiment Station Farm House. |
| Ross, Louis Warren,[1] | Boston, | Phi Sigma Kappa. |
| Saidel, Harry Samuel,[1] | Worcester, | 101 Pleasant Street. |
| Sargent, George Leonard, | Merrimac, | 4 North College. |
| Saunders, William Putnam, | Lawrence, | 20 South College. |
| Sauter, John Martin, | Turners Falls, | 13 North College. |
| Saville, William, Jr., | Waban, | 7 South College. |
| Schaefer, Leonard Charles, | Holyoke, | Entomology Building. |
| Schwab, Andrew Nathan, | Yalesville, Conn., | French Hall. |
| Selkregg, Edwin Reimund,[1] | Northeast, Pa., | North College. |
| Shumway, Paul Edward, | Greenfield, | 3 South College. |
| Sims, James Stanley,[1] | Melrose, | 20 South College. |
| Smith, Herbert Dwight,[1] | Amherst, | 60 Pleasant Street. |
| Smith, Richard Woodworth, | Pittsfield, | 12 North College. |
| Spaulding, Almon Whitney, | Newton Highlands, | 16 South College. |
| Squires, Paul Revere, | Belchertown, | 85 Pleasant Street. |
| Stearns, Carlton McIntyre,[1] | Melrose, | 15 Phillips Street. |
| Stiles, Albert Ralph,[1] | Arlington Heights, | 7 South College. |
| Stowell, Harold Thurber, | Amherst, | 193 South Pleasant Street. |
| Thayer, William Wallace, | Somerville, | Lambda Chi Alpha. |
| Tuthill, Samuel Fuller, | Mattapoisett, | 16 South College. |
| Upson, Everett Langdon, | New Britain, Conn., | 4 South College. |
| Walbridge, Henry Blood, | Bennington, Vt., | 4 North College. |
| Warner, Merrill Pomeroy,[1] | Sunderland, | 8 South College. |
| Warren, Harold Manson,[1] | Melrose, | 1 South College. |
| Warren, James Joseph, | North Brookfield, | 3 North College. |

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[1] Work incomplete.

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| Webster, Frank Cedric, | Harvard, | Mathematics Building. |
| Westman, Robert Clayton,[1] | Roslindale, | 15 South College. |
| Whitcomb, Warren Draper, | Waltham, | 88 Pleasant Street. |
| Whitney, Joseph Fradley, | Westminster, | Kappa Sigma. |
| Wies, Calmy, | Malden, | 31 Pleasant Street. |
| Wilber, Charles Raymond, | Walpole, | 6 North College. |
| Wilcox, Timothy Palmer, | Andover, | 1 North College. |
| Williams, Arthur Franklin, | Sunderland, | 10 South College. |
| Williams, Herbert Clifton, | South Hadley Falls, | Birch Lawn. |

### CLASS OF 1918.

| | | |
|---|---|---|
| Additon, Elizabeth Emery,[1] | Newton Center, | Draper Hall. |
| Babbitt, George King,[1] | Boston, | 85 Pleasant Street. |
| Bainbridge, Frank Benedict,[1] | Paterson, N. J., | 5 South College. |
| Baker, Foster Kenneth, | Fairhaven, | Entomology Building. |
| Baker, Henry Raymond, | Amherst, | West Street. |
| Barton, George Wendell, | North Sudbury, | 36 North Prospect Street. |
| Binks, Frank Joseph,[1] | Maynard, | Beta Kappa Phi. |
| Boaz, William Henry, | Covesville, Va., | Phi Sigma Kappa. |
| Boyd, Robert Lucius,[1] | Lynn, | Colonial Inn. |
| Bruce, Walter Griffith, | Springfield, | 21 Fearing Street. |
| Buchanan, Walter Gray, | Chicopee, | 97 Pleasant Street. |
| Canlett, Franklin Harwood, | Bedford, | 36 North Prospect Street. |
| Carlson, Fred Albert, | Pittsfield, | 84 Pleasant Street. |
| Carter, Thomas Edward,[1] | West Andover, | 82 Pleasant Street. |
| Chamberlain, Sumner Fiske,[1] | Holden, | 83 Pleasant Street. |
| Chambers, Roger James, | Dorchester, | 9 North College. |
| Chapman, John Alden, | Salem, | Phi Sigma Kappa. |
| Clapp, Roger Francis, | Salem, | 79 Pleasant Street. |
| Clark, Stewart Sandy,[1] | Holyoke, | Chemistry Laboratory. |
| Cotton, Elwyn Page,[1] | Woburn, | 87 Pleasant Street. |
| Davis, Albert Noah,[1] | Somers, Conn., | 4 Chestnut Street. |
| Davis, Dwight Shaw,[1] | Woburn, | Commons Club. |
| Dowd, William Lawrence,[1] | North Amherst, | North Amherst. |
| Duncan, George James,[1] | Arlington, | 101 Pleasant Street. |
| Dunn, Arthur Paul,[1] | Malden, | 90 Pleasant Street. |
| Edes, David Oliver Nourse, | Bolton, | 82 Pleasant Street. |
| Ellis, Ralph Chick,[1] | West Newton, | Colonial Inn. |
| Emmerich, Louis Philip,[1] | Paterson, N. J., | 6 South College. |
| Erickson, George Edwin, | Campello, | Lincoln Avenue. |
| Faneuf, Leo Joseph,[1] | West Warren, | Birch Lawn. |
| Farrar, Delwin Bruce,[1] | Amherst, | 1 Dana Street. |
| Fellows, Harold Carter,[1] | Peabody, | Commons Club. |
| Ferris, Adaline Lawson,[1] | Ridgefield Park, N. J., | Draper Hall. |
| Foley, William Albert, | Palmer, | 35 North Prospect Street. |
| Foster, Hamilton Knight,[1] | New Rochelle, N. Y., | 4 Lessey Street. |
| Foster, Roy Wentworth, | Lynn, | 82 Pleasant Street. |
| Francis, Donald Smith,[1] | Athol, | Beta Kappa Phi. |
| Fraser, Charles Allen,[1] | Plymouth, | Kappa Sigma. |
| Frellick, Arthur Lester,[1] | Everett, | 13 Phillips Street. |
| Fuller, Camille Baldwin,[1] | West Quincy, | Commons Club. |
| Gasser, Thomas Jefferson, | Uxbridge, | Alpha Sigma Phi. |
| Gifford, Flavel Mayhew, | West Tisbury, | 6 Nutting Avenue. |
| Gillette, Nathan Warner,[1] | Revere, | 5 South College. |
| Goodridge, George Lucien,[1] | Melrose, | 82 Pleasant Street. |
| Goodwin, William Irving,[1] | Bradford, | 82 Pleasant Street. |
| Gordon, Frederick George,[1] | Plymouth, | Birch Lawn. |
| Gray, Milton Berford, | Woods Hole, | 13 Phillips Street. |
| Grayson, Forrest, | Milford, | 1 North College. |

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[1] Work incomplete.

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|---|---|---|
| Haines, Foster Kingsley, | Peabody, | 120 Pleasant Street. |
| Hance, Forrest Sansbury,[1] | Paterson, N. J., | Colonial Inn. |
| Harwood, Ralph Wallace, | Barre, | Phi Sigma Kappa. |
| Hawley, Robert Dorman, | Springfield, | Phi Sigma Kappa. |
| Hayes, Olin Henry,[1] | Lawrence, | 7 Nutting Avenue. |
| Heffron, Paul John,[1] | Sherborn, | Birch Lawn. |
| Higgins, Leo Clement,[1] | Amesbury, | 24 Beston Street. |
| Hilliker, Harriett Franklin,[1] | East Lynn, | 9 Phillips Street. |
| Holmes, George Frederick, | Ipswich, | 60 Pleasant Street. |
| Holmes, Robert Palmer,[1] | Wakefield, | Aggie Inn. |
| Howard, Arthur Merchant, | Pittsfield, | 84 Pleasant Street. |
| Howe, Albert Edward,[1] | Needham, | Lincoln Avenue. |
| Howes, Donald Francis, | Ashfield, | Birch Lawn. |
| Hunnewell, Paul Fiske, | Winthrop, | Phi Sigma Kappa. |
| Huntoon, Douglas Henderson, | Norwood, | Phi Sigma Kappa. |
| Hurlburt, Ralph Walter, | Ashley Falls, | 94 Pleasant Street. |
| Illman, Margaret Keble,[1] | Schuyler Falls, N. Y., | Draper Hall. |
| Ingalls, Irving Weaver,[1] | Brooklyn, N. Y., | Beta Kappa Phi. |
| Jepsky, Abraham, | Medway, | Birch Lawn. |
| Johnson, Birger Lars,[1] | Dorchester, | 29 McClellan Street. |
| Kennedy, Carl Francis,[1] | Milford, | 85 Pleasant Street. |
| Lanphear, Marshall Olin, | Windsor, Conn., | 96 Pleasant Street. |
| Lawrence, Lewis Henry,[1] | Falmouth, | 79 Pleasant Street. |
| Lawton, Ralph Wilber,[1] | Fall River, | 17 Fearing Street. |
| Leonard, Ralph Stanley,[1] | Melrose, | 82 Pleasant Street. |
| Levine, Darwin Solomon, | Sherborn, | 11½ Amity Street. |
| Lipshires, David Mathew, | Roxbury, | Flint Laboratory. |
| Loring, William Rupert, | Great Barrington, | Physics Building. |
| Lyons, Louis Martin, | Rockland, | East Experiment Station. |
| Maginnis, John Joseph,[1] | Lawrence, | Alpha Sigma Phi. |
| Mallorey, Alfred Sidney,[1] | Lynn, | 15 Hallock Street. |
| Marshall, Max Skidmore, | Amherst, | 44 Sunset Avenue. |
| McKee, William Henry,[1] | Chelsea, | M. A. C. Store. |
| McNaught, Warren Henry, | Plymouth, | Colonial Inn. |
| McRae, Herbert Rankin,[1] | Malden, | 4 Nutting Avenue. |
| Messenger, Kenneth Leroy, | Winsted, Conn., | Kappa Sigma. |
| Millard, Harold Baldwin, | Great Barrington, | Veterinary Building. |
| Minor, John Bacon, Jr.,[1] | New Britain, Conn., | Kappa Sigma. |
| Mitchell, Edward Nahum,[1] | Medford, | Phi Sigma Kappa. |
| Mitchell, Theodore Bertis, | Needham, | 15 North College. |
| Mower, Carl Taft,[1] | Montpelier, Vt., | Kappa Sigma. |
| Moynihan, Patrick Joseph,[1] | Holyoke, | Alpha Sigma Phi. |
| Newton, Gaylord Arthur, | Durham, Conn., | 21 Fearing Street. |
| Norcross, Gardner Clyde, | Brimfield, | 35 East Pleasant Street. |
| Odams, Lester Nichols, | Salem, | 79 Pleasant Street. |
| Oertel, August Leonard, | South Hadley Falls, | Birch Lawn. |
| O'Heron, Francis James,[1] | East Milton, | 5 North College. |
| O'Neill, Oliver Maurice, | Dorchester, | 29 McClellan Street. |
| Patch, Lawrence Henry, | Wenham, | Plant House. |
| Petit, Arthur Victor, | Amherst, | 31 East Pleasant Street. |
| Phipps, Clarence Ritchie, | Dorchester, | 88 Pleasant Street. |
| Popp, Edward Williams,[1] | Albany, N. Y., | 9 North College. |
| Powell, James Congdon, | Newport, R. I., | 6 South College. |
| Pratt, Oliver Goodell, | Salem, | Kappa Sigma. |
| Preble, John Nelson, | Jamaica Plain, | Theta Chi. |
| Raymond, Clinton Rufus, | Beverly, | 82 Pleasant Street. |
| Reumann, Theodore Henry, | New Bedford, | 87 Pleasant Street. |
| Richardson, Stephen Morse, | Montague, | 6 South College. |
| Ritter, Ernest, | New Britain, Conn., | 88 Pleasant Street. |
| Roberts, Oliver Cousens,[1] | Arlington, | 88 Pleasant Street. |

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[1] Work incomplete.

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|---|---|---|
| Robinson, William Herbert,[1] | Hudson, | 87 Pleasant Street. |
| Rosequist, Birger Reignold,[1] | New Bedford, | 85 Pleasant Street. |
| Russell, Howard Leigh, | Worcester, | 116 Pleasant Street. |
| Rutter, Walter Frederick,[1] | Lawrence, | 17 Fearing Street. |
| St. George, Raymond Alexander,[1] | East Lynn, | Commons Club. |
| Sampson, Frederick Bucknam,[1] | Fall River, | 60 Pleasant Street. |
| Sanborn, Deane Waldron, | Nantucket, | Birch Lawn. |
| Sawyer, Wesley Stevens, | Jamaica Plain, | Beta Kappa Phi. |
| Sawyer, William George, | Berlin, | 8 South College. |
| Schlough, George Homer,[1] | Waltham, | 82 Pleasant Street. |
| Schwartz, Louis,[1] | Melrose, | West Experiment Station. |
| Smith, Carleton Tower, | West Newton, | 82 Pleasant Street. |
| Smith, Sidney Summer, | Roslindale, | 3 Fearing Street. |
| Spaulding, Lewis Winans,[1] | Boston, | 5 South College. |
| Stackpole, Frank Charles,[1] | Somerville, | 15 North College. |
| Stjernlof, Axel Uno, | Worcester, | Farview Way. |
| Stowe, Raymond Timothy, | Scitico, Conn., | 51 Amity Street. |
| Stowers, Addison Clifford, | Dorchester, | South College. |
| Sullivan, Harold Leo, | Lawrence, | 9 North College. |
| Swift, Raymond Walter,[1] | North Amherst, | North Amherst. |
| Thompson, Wells Nash, | Adams, | Alpha Sigma Phi. |
| Thorpe, Richard Warren,[1] | West Medford, | Phi Sigma Kappa. |
| Tilton, Arthur Dana, | Wellesley, | Phi Sigma Kappa. |
| Van Alstyne, Lewis Morrell,[1] | Kinderhook, N. Y., | Phi Sigma Kappa. |
| Weeks, Roger Wolcott,[1] | Hyde Park, | Kappa Sigma. |
| Wilbur, Laurence Weston,[1] | South Middleborough, | Beta Kappa Phi. |
| Willoughby, Raymond Royce, | New Britain, Conn., | 24 Beston Street. |
| Wooding, Paul Bennett,[1] | Yalesville, Conn., | M. A. C. Plant House. |
| Woodworth, Brooks,[1] | Lowell, | 85 Pleasant Street. |
| Worthley, Harlan Noyes, | Greenwood, | Kappa Sigma. |

### Class of 1919.

| | | |
|---|---|---|
| Alden, Dean Watson,[1] | Proctor, Vt., | Lambda Chi Alpha. |
| Bagg, Quincy Austin,[1] | South Hadley, | 60 Pleasant Street. |
| Baker, William Alphonso, | Melrose, | Lambda Chi Alpha. |
| Baker, William Herbert, Jr., | Chesterfield, | Theta Chi. |
| Batchelder, Stewart Putnam, | North Reading, | 7 South College. |
| Batista, Victor,[1] | Havana, Cuba, | 90 Pleasant Street. |
| Baxter, Herbert Hill,[1] | Brighton, | Alpha Sigma Phi. |
| Beadle, Herbert Ocumpaugh,[1] | Lima, N. Y., | 18 Nutting Avenue. |
| Bigelow, George Samuel,[1] | Millville, N. J., | 3 McClure Street. |
| Blanchard, Carlton Douglas,[1] | Uxbridge, | Kappa Sigma. |
| Blanchard, George Kinson, | Abington, | Kappa Sigma. |
| Bögholt, Carl Miller,[1] | Newport, R. I., | 27 Pleasant Street. |
| Boland, Kells Shepard,[1] | South Boston, | 120 Pleasant Street. |
| Bond, Herbert Richard, | Needham, | Lincoln Avenue. |
| Bowen, Arthur Newton,[1] | Wollaston, | 15 Phillips Street. |
| Bowen, Maurice Stetson,[1] | Middleborough, | 81 Pleasant Street. |
| Boyce, Alan Freeman, | Melrose, | 83 Pleasant Street. |
| Boynton, Raymond Woods,[1] | Framingham, | 85 Pleasant Street. |
| Bradley, William George,[1] | Groton, | 88 Pleasant Street. |
| Brigham, Sylvia Bowen, | Newtonville, | Draper Hall. |
| Brown, Ralph Hall,[1] | Ayer, | Kappa Sigma. |
| Buffum, Eliot Mansfield, | Waban, | 10 South College. |
| Burt, Henry John, | Arlington, | 10 Allen Street. |
| Burton, Lee Williams, | Plainville, | 35 East Pleasant Street. |
| Callanan, John Edward,[1] | Dorchester, | 60 Pleasant Street. |
| Callanan, Vincent DePaul, | Malden, | 4 Chestnut Street. |
| Carpenter, Hall Bryant,[1] | Somerville, | Kappa Sigma. |
| Carroll, Olive Evangeline,[1] | Dorchester, | Draper Hall. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Cassidy, Morton Harding,[1] | East Boston, | 82 Pleasant Street. |
| Castle, George Burdette,[1] | Pittsfield, | 77 Pleasant Street. |
| Chandler, Arthur Lincoln, | Leominster, | 3 Nutting Avenue. |
| Chapin, Frederic Charles, | Greenfield | West Experiment Station. |
| Chase, Malcolm Willis,[1] | Amesbury, | 94 Pleasant Street. |
| Chisholm, Robert Dudley, | Melrose Highlands, | 66 Pleasant Street. |
| Clapp, Agustus Warren, | East Braintree, | Lambda Chi Alpha. |
| Coderre, Ernest Laurier, | Southbridge, | 35 North Prospect Street. |
| Collins, Robert Burleigh, | Rockland, | 88 Pleasant Street. |
| Cone, Willis Refine,[1] | Mittineague, | 42 McClellan Street. |
| Cooley, Edwin Prince, | Sunderland, | Sunderland. |
| Cosby, Alfred Francis, | Westfield, | 15 Amity Street. |
| Crane, Arthur Francis,[1] | North Hanover, | 24 Beston Street. |
| Crimmin, Royce Brainerd,[1] | Bradford, | 82 Pleasant Street. |
| Crowe, Charles, | Norwich, Conn., | Kappa Sigma. |
| Davies, James Pillsbury, | Cambridge, | 6 Phillips Street. |
| Day, Harold Ralph, | Milford, | North College. |
| Dickinson, Victor Abel,[1] | Amherst, | Mount Pleasant. |
| Dunbar, Charles Oliver, | Westfield, | 84 Pleasant Street. |
| Erhard, Bena Gertrude, | East Milton, | Draper Hall. |
| Erickson, Gunnar Emmanuel, | West Lynn, | 29 McClellan Street. |
| Evans, Myrton Files, | West Somerville, | Kappa Sigma. |
| Faber, Edward Stuart, | Plainfield, N. J., | M. A. C. Store. |
| Faneuf, Ambrose Clement,[1] | West Warren, | Birch Lawn. |
| Farrington, Robert Pierce,[1] | Nantucket, | 15 Beston Street. |
| Faxon, Paul,[1] | Wellesley Hills, | 66 Pleasant Street. |
| Fellows, Katharine Adelheid, | Northampton, | 21 Amity Street. |
| Ferriss, Samuel Boynton, | New Milford, Conn., | Beta Kappa Phi. |
| Field, Wilbert Daniel,[1] | Winter Hill, | 29 McClellan Street. |
| Fiske, Eustace Bridge, | Somerville, | 6 Nutting Avenue. |
| Fogg, Verne Allen, | Topsfield, | 4 Chestnut Street. |
| Fox, Charles, | Baltimore, Md., | 17 Kellogg Avenue. |
| French, Willard Kyte, | Worcester, | 6 Phillips Street. |
| Garde, Earl Augustus, | Lynn, | 30 North Prospect Street. |
| Garvey, Mary Ellen Monica, | Amherst, | 27 South Prospect Street. |
| Gilligan, Gerald Mathew,[1] | West Warren, | 120 Pleasant Street. |
| Glavin, William Francis, | Wenham, | North College. |
| Goff, Howard Mason, | Cambridge, | 120 Pleasant Street. |
| Graves, Walter Decker,[1] | Brookline, | 1 North College. |
| Green, Lynn, | Schenevus, N. Y., | 6 Nutting Avenue. |
| Guba, Emil Frederick, | New Bedford, | 6 Nutting Avenue. |
| Hall, Frank Edwin,[1] | Revere, | 103 Pleasant Street. |
| Hamilton, Howard Milton,[1] | Winchester, | Cottage Street. |
| Harding, George Warren,[1] | Somerville, | Flint Laboratory. |
| Harris, Ethel Lovett,[1] | Beverly, | Draper Hall. |
| Hartwell, Richard Raymond,[1] | Springfield, | Colonial Inn. |
| Harvey, Ebenezer Erskine,[1] | Washington, D. C., | Physics Building. |
| Hastings, Louis Pease, | Springfield, | Kappa Sigma. |
| Hathaway, Wilfred Adelbert,[1] | Taunton, | 88 Pleasant Street. |
| Hodgson, Benjamin Earl, | Methuen, | 22 Amity Street. |
| Hopkins, George Randolph Lawrence. | Orleans, | 60 Pleasant Street. |
| Howe, Ralph Thomas, | Melrose Highlands, | 120 Pleasant Street. |
| Hunter, Harold Clayton,[1] | South Hadley Falls, | 60 Pleasant Street. |
| Jewell, Charles Henry, | Merrimac, | 17 Kellogg Avenue. |
| Johnson, Lawrence Wilhelm, | Avon, | 12 Cottage Street. |
| Johnson, Sidney Clarence, | Gloucester, | Beta Kappa Phi. |
| Jordan, Raymond Douglas,[1] | Springfield, | 21 Fearing Street. |
| Kennedy, Alan Giles,[1] | Milford, | 85 Pleasant Street. |
| Kimball, William Lincoln,[1] | Orange, | 35 East Pleasant Street. |
| King, William Cutting,[1] | Suffield, Conn., | 120 Pleasant Street. |

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[1] Work incomplete.

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|---|---|---|
| Knight, Frank Edward,[1] | Brimfield, | 35 East Pleasant Street. |
| Knowlton, Priscilla,[1] | Roxbury, | M. A. C. Farm House. |
| Leary, Frank Dennis, | Brockton, | 12 Cottage Street. |
| Leiper, McCarrell Hudson, | Blauvelt, N. Y., | Lincoln Avenue. |
| Liebman, Anna, | Dorchester, | Draper Hall. |
| Logan, Milan Alexander, | Brockton, | Lincoln Avenue. |
| Mansell, Elton Jessup,[1] | Cambridge, | 4 Chestnut Street. |
| Martin, Andrew Laurence,[1] | Hopedale, | Colonial Inn. |
| Mather, William, | Amherst, | Fitts House. |
| Mattoon, Charles Gordon, | Pittsfield, | 120 Pleasant Street. |
| McCarthy, Arthur Martin, | Monson, | 9 South College. |
| McClellan, Adams Newton, | Keene, N. H., | Kappa Sigma. |
| Montgomery, Forest Kimball,[1] | East Orange, N. J., | 87 Pleasant Street. |
| Moor, Erwin Charles,[1] | Lynn, | 10 Allen Street. |
| Moore, John Raymond, | Tolland, | Birch Lawn. |
| Morgan, Earl Amos,[1] | Amherst, | 2 Allen Street. |
| Morse, Maurice, | Dorchester, | Entomology Building. |
| Morton, Elmer Joshua,[1] | Watertown, | Commons Club. |
| Newbold, Douglas Tracy, | Northampton, | 87 Pleasant Street. |
| Newton, Adelbert,[1] | Lenox, | 77 Pleasant Street. |
| Newton, Edward Buckland,[1] | Boston, | Chemistry Laboratory. |
| O'Hara, Joseph Ernest, | Worcester, | 6 Phillips Street. |
| Parke, Robert Warren, | Winchendon, | 5 Allen Street. |
| Parkhurst, Raymond Thurston, | Fitchburg, | Kappa Sigma. |
| Parsons, Edward Field, | North Amherst, | North Amherst. |
| Peck, George Newberry, | North Granby, Conn., | 10 Allen Street. |
| Peck, Roger Eugene,[1] | Shelburne, | 6 Nutting Avenue. |
| Peirson, Henry Byron, | Bradford, | 18 Nutting Avenue. |
| Perry, Errol Clinton,[1] | Acushnet, | 15 Hallock Street. |
| Peterson, Leroy Duane,[1] | Brooklyn, N. Y., | 120 Pleasant Street. |
| Pierpont, Frederick Trowbridge, | Chester, Pa., | 18 Nutting Avenue. |
| Pond, Allan Leon, | Holliston, | Kappa Sigma. |
| Poole, Harold Walter,[1] | Hudson, | Beta Kappa Phi. |
| Prée, Karl Julius, | Brookline, | 88 Pleasant Street. |
| Pulley, Marion Gertrude,[1] | Melrose, | 2 Allen Street. |
| Quimby, Arthur Edmund, | Boston, | 36 North Prospect Street. |
| Ratner, Charles Cosrael, | Springfield, | 3 Pleasant Street. |
| Rea, Julian Stuart, | East Weymouth, | Lincoln Avenue. |
| Readio, Roger Frank, | Florence, | 90 Pleasant Street. |
| Record, Harold Jordan,[1] | West Boylston, | Butterfield Avenue. |
| Rice, Harold Miller, | Cheshire, | Stockbridge Hall. |
| Robbins, Waldo Whiting, | South Hingham, | 14 Nutting Avenue. |
| Roberts, Mark Anthony, | Dorchester, | 25 Lincoln Avenue. |
| Ross, Donald,[1] | Boston, | Phi Sigma Kappa. |
| Rowe, Clifford Alton,[1] | East Orange, N. J., | Phi Sigma Kappa. |
| Sargent, Walter Harriman,[1] | Malden, | Draper Hall. |
| Schenkelberger, Frederic,[1] | Quincy, | 10 South College. |
| Seavey, Paul Stanley,[1] | Cambridge, | Commons Club. |
| Sedgwick, Alfred, | Fall River, | 85 Pleasant Street. |
| Sexton, Ernest Francis,[1] | Darien, Conn., | 3 Nutting Avenue. |
| Sheldon, Howard Rhoades, | Mill River, | 4 Chestnut Street. |
| Sibley, Helen Aramintha, | Longmeadow, | Draper Hall. |
| Skinner, Everett Hamilton,[1] | West Upton, | Kappa Sigma. |
| Smith, Jonathan Harold, | Roslindale, | 88 Pleasant Street. |
| Smith, Wendell Frederick, | Troy, N. Y., | 10 Allen Street. |
| Spaulding, Harold Edwin, | Milford, | Kappa Sigma. |
| Spencer, Arthur Winthrop,[1] | Danvers, | North College. |
| Stafford, Irving Boynton, | Fall River, | 6 Nutting Avenue. |
| Stearns, Horace David, | Waltham, | 18 Nutting Avenue. |
| Stevens, Chester Dillingham, | Reading, | 10 Allen Street. |
| Stockwell, Erwin Sidney, Jr., | Sharon, | Commons Club. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Strack, Edward, | Framingham, | Clark Hall. |
| Sutherland, Ralph, | Cambridge, | 85 Pleasant Street. |
| Sweeney, William Joseph,[1] | Dorchester, | 35 North Prospect Street. |
| Taylor, Edmund Billings, | Wollaston, | 17 Fearing Street. |
| Thayer, Julian Bailey, | Durham Center, Conn., | 36 North Prospect Street. |
| Thayer, Weston Cushing,[1] | Hingham, | 53 Lincoln Avenue. |
| Thomas, Frank DesAutel,[1] | Milford, | Lincoln Avenue. |
| Tietz, Harrison, | Richmond Hill, N. Y., | 24 Beston Street. |
| Tirrell, Loring Vinson,[1] | South Weymouth, | Lincoln Avenue. |
| Underwood, Arthur Leslie, | Maynard, | Beta Kappa Phi. |
| Vickers, John, | Amherst, | Beta Kappa Phi. |
| Waite, Richard Austin, | Middlefield, | 90 Pleasant Street. |
| Wells, Marion Nichols, | Springfield, | Draper Hall. |
| Wheeler, Russell Hubbell,[1] | Hawleyville, Conn., | 4 Chestnut Street. |
| White, Edward Asa, | Providence, R. I., | 4 Chestnut Street. |
| Whittle, Clarence Parker, Jr.,[1] | Weymouth, | Phi Sigma Kappa. |
| Williams, Allan Carruth, | Rockland, | Commons Club. |
| Williams, Kenneth Sanderson,[1] | Sunderland, | 9 South College. |
| Window, James Joseph, | Amherst, | 7 Allen Street. |
| Wing, Arland Junius, | Hathorne, | North College. |
| Wood, Oliver Wiswell, | Arlington, | 81 Pleasant Street. |
| Woodard, Chester Smith,[1] | Leverett, | Leverett. |
| Woodbury, Ray Willard,[1] | Newburyport, | Cottage Street. |
| Woodside, Wilfred Livingstone, | Boston, | 4 Chestnut Street. |
| Yesair, John,[1] | Byfield, | Kappa Sigma. |

### CLASS OF 1920.

| | | |
|---|---|---|
| Allen, Harold Kenneth, | Belchertown, | Belchertown. |
| Anderson, George, | Somerville, | 1 South College. |
| Anderson, Gust William,[1] | Brockton, | Lincoln Avenue. |
| Andrews, George Henry, | Farmington, Conn., | 1 School Street. |
| Apsey, George Wills, Jr.,[1] | Winchester, | 17 Phillips Street |
| Armstrong, John Shepard,[1] | East Sandwich, | 35 East Pleasant Street. |
| Armstrong, Philip Brownell,[1] | Rutherford, N. J., | Farview Way. |
| Babcock, Leslie Edmund,[1] | Marlborough, | 36 North Prospect Street. |
| Bacon, Milo Roderick, | Leominster, | 87 Pleasant Street. |
| Bailey, William, | Williamstown, | 25 Pleasant Street. |
| Ball, Harry Abraham, | Bridgewater, | 5 Sunset Avenue. |
| Ball, Lorin Earl, | Amherst, | 3 Allen Street. |
| Beauregard, Winfield Scott, | Framingham, | 53 Lincoln Avenue. |
| Berman, Harry, | Holyoke, | Birch Lawn. |
| Berman, Louis,[1] | Dorchester, | 41 Pleasant Street. |
| Bigelow, Henry Charles, | Millville, N. J., | 3 McClure Street. |
| Blake, Robert Austin,[1] | Wollaston, | Pleasant Street. |
| Blanchard, Kenneth,[1] | Haverhill, | 8 Nutting Avenue. |
| Boardman, Charles Meade, | Amherst, | 33 Lincoln Avenue. |
| Bowen, Abram Temple,[1] | Granville, N. Y., | 7 Allen Street. |
| Bowmar, Ralph Burton, | Canton, | 29 North Prospect Street. |
| Bridge, James Pitts,[1] | San Antonio, Tex., | 120 Pleasant Street. |
| Brown, Roy Robertson, | Wollaston, | Sunny Villa. |
| Bunker, Carroll Wooster, | West Somerville, | 4 Nutting Avenue. |
| Burnett, Paul Lapham, | Leicester, | 5 Nutting Avenue. |
| Burns, Allan Melville, | Taunton, | 83 Pleasant Street. |
| Cande, Robert Parsons, | Pittsfield, | 5 Fearing Street. |
| Card, Ralph Hunter, | Somerville, | 3 Nutting Avenue. |
| Carleton, John Foxcroft, | East Sandwich, | 35 East Pleasant Street. |
| Center, Arthur Edwin,[1] | Springfield, | 73 Pleasant Street. |
| Chase, Francis Chapin, | Royalston, | 35 East Pleasant Street. |
| Clarridge, Fred William, | Milford, | Lincoln Avenue. |
| Clough, Alfred Arnold, | Wollaston, | Sunny Villa. |
| Cole, Frederick Eugene, Jr., | South Portland, Me., | 29 McClellan Street. |

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[1] Work incomplete.

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|---|---|---|
| Crafts, Gordon Burnham, | Manchester, | 25 Pleasant Street. |
| Crawford, Alexander George,[1] | Waverley, | 10 Nutting Avenue. |
| Crawford, John Alexander, | Allston, | 10 Allen Street. |
| Daggett, Clinton Jones, | New York, N. Y., | 23 Lincoln Avenue. |
| Davenport, Frank Semore,[1] | Dorchester, | Lincoln Avenue. |
| Davidson, Donald Gordon, | Amherst, | 7 Northampton Road. |
| Davis, Orrin Chester, | Belchertown, | Belchertown. |
| Delahunt, John Kersey,[1] | Boston, | 10 Nutting Avenue. |
| Derick, Glendon Robert, | Clinton, | 36 North Prospect Street. |
| Dewing, Warren Montague, | Kingston, | 31 East Pleasant Street. |
| Dixon, Harry Louis, | Harrisville, R. I., | 66 Pleasant Street. |
| Doucette, Charles Felix, | Melrose, | Hillside Avenue. |
| Douglass, Donald Churchill, | Arlington, | 3 Nutting Avenue. |
| Dwyer, James Edward, | Sunderland, | Alpha Sigma Phi. |
| Earley, Marion Edith,[1] | West Newton, | 9 Phillips Street. |
| Eldredge, Reuel West, | Winchester, | Pease Avenue. |
| Emery, Herbert Martin,[1] | Newburyport, | Cottage Street. |
| Farnsworth, Richard Wasgatt, | Lancaster, | 7 East Pleasant Street. |
| Fuller, Lorenzo, | Lowell, | 7 Nutting Avenue. |
| Gaskill, Harland Everett,[1] | Hopedale, | North Pleasant Street. |
| Gay, Laurence Washburn, | Groton, | 88 Pleasant Street. |
| Golosov, James Sidney, | Dorchester, | 67 Pleasant Street. |
| Gorwaiz, Richard Hamblet, | Newburyport, | 66 Pleasant Street. |
| Graff, Leland Sprague,[1] | Reading, | 10 Allen Street. |
| Graves, Carlisle Ferrin, | Stamford, Conn., | 7 Allen Street. |
| Gray, Irving Emery, | Woods Hole, | 13 Phillips Street. |
| Gustafson, William Nathaniel,[1] | Worcester, | 5 Nutting Avenue. |
| Hale, Frank Thompson Caldwell, | Byfield, | 66 Pleasant Street. |
| Hamlin, Hazen Wolcott,[1] | Amherst, | 35 East Pleasant Street. |
| Harrington, Harold Leon, | Lunenburg, | 44 Triangle Street. |
| Haskins, Harold Arthur, | North Amherst, | North Amherst. |
| Hathaway, Richmond Hobson, | Warren, | 35 East Pleasant Street. |
| Hathaway, Warren Sidney,[1] | Somerset, | 75 Pleasant Street. |
| Haynes, Charles Francis,[1] | Canton, | 36 North Prospect Street. |
| Hemenway, Carl Marshall,[1] | Williamsburg, | 73 Pleasant Street. |
| Hersom, Allen Humphrey,[1] | Acushnet, | 46 Pleasant Street. |
| Higgs, John Alden, | Wareham, | 120 Pleasant Street. |
| Hill, John Farren,[1] | Scituate, | Pease Avenue. |
| Hill, Theodore, Jr., | Jefferson Valley, N. Y., | 44 Triangle Street. |
| Hillabold, Charles Kroh, | Syracuse, Ind., | Mount Pleasant. |
| Holland, Frank Harold,[1] | Shrewsbury, | 73 Pleasant Street. |
| Holloway, John William, | Taunton, | 81 Pleasant Street. |
| Horne, Robert Sanderson, | Wellesley Farms, | 77 Pleasant Street. |
| Howland, George Herbert,[1] | Melrose, | 120 Pleasant Street. |
| Hurd, Davis Alden, | Wellesley Hills, | 36 North Prospect Street. |
| Hurd, Gordon Killam, | Millbury, | 36 North Prospect Street. |
| Hyde, Kenneth Squier, | Amherst, | 51 Pleasant Street. |
| Iorio, Carlo Antonio, | Springfield, | 75 Pleasant Street. |
| Jakeman, Brooks Franklin,[1] | Winchester, | 116 Pleasant Street. |
| Johnson, Alberta, | Old Westbury, L. I., | M. A. C. Farm House. |
| Johnson, Conrad John, | Campello, | 15 Hallock Street. |
| Jones, Edson Temple,[1] | Roslindale, | 42 McClellan Street. |
| Jones, Robert Lambert, | North Easton, | 5 McClellan Street. |
| Keene, Walter William, | Roslindale, | 12 Cottage Street. |
| King, Starr Margetts, | Pittsfield, | 5 Fearing Street. |
| Lambert, Richard Bowles,[1] | Stow, | 21 Amity Street. |
| Lent, Donald Ashford, | Maynard, | 35 East Pleasant Street. |
| Levine, Maurice Eleazer, | Sherborn, | Lincoln Block. |
| Liang, Ping, | Canton, China, | 21 Fearing Street. |
| Lindquist, Harry Gotfred, | Holden, | 15 Hallock Street. |
| Littlefield, John Edwin, | Lynn, | 15 Hallock Street. |
| Lothrop, Earle Daniel, | West Bridgewater, | 77 Pleasant Street. |

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[1] Work incomplete.

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|---|---|---|
| Luce, William Alan, | West Boylston, | 4 Chestnut Street. |
| Lyons, Henry Egmont, | Norwell, | 29 North Prospect Street. |
| MacArdle, Herbert Aloysius,[1] | Worcester, | Colonial Inn. |
| MacLeod, Guy Franklin, | Lowell, | Lincoln Avenue. |
| Mallon, Charles Hugh, | East Braintree, | 75 Pleasant Street. |
| Mangum, Andrew Bruyette,[1] | Holyoke, | 60 Pleasant Street. |
| Maples, James Comly, | Port Chester, N. Y., | 81 Pleasant Street. |
| Martin, Laurence Paul, | Malden, | 6 Phillips Street. |
| McDonald, Milton Crandall, | Peabody, | 120 Pleasant Street. |
| McGeorge, William Brimble, | Greenwich, Conn., | 3 McClellan Street. |
| McNulty, Raymond Henry, | Amherst, | 6 South East Street. |
| Meserve, Albert Wadsworth,[1] | Framingham, | 53 Lincoln Avenue. |
| Millard, Helen Stanley, | Great Barrington, | M. A. C. Farm House. |
| Munroe, Raymond Franklin, | Fall River, | Commons Club. |
| Murray, Harry Athol, Jr.,[1] | Raynham Centre, | 81 Pleasant Street. |
| Mutty, Allan Victor,[1] | Boston, | 4 Chestnut Street. |
| Newell, Philip Sanger, | West Newton, | 35 East Pleasant Street. |
| Oppe, Herman DeWitt, | Newtown, Conn., | 94 Pleasant Street. |
| Ortloff, Henry Stuart,[1] | Newton, | Clark Hall. |
| Paige, Joseph Cutler,[1] | Hardwick, | 7½ East Pleasant Street. |
| Parkin, William Hildreth, | West Springfield, | Tillson Court. |
| Peckham, William Harold,[1] | Newport, R. I., | 81 Pleasant Street. |
| Phillips, Stephen Austin,[1] | Pittsfield, | 75 Pleasant Street. |
| Plowman, George Taylor, Jr., | Winthrop, | 13 Phillips Street. |
| Porteck, Henry George,[1] | Lowell, | Lincoln Avenue. |
| Putnam, Frederic Henry,[1] | Framingham, | 73 Pleasant Street. |
| Quadland, Howard Preston,[1] | North Adams, | 81 Pleasant Street. |
| Quincy, Percy Edmund,[1] | Allston, | 7 Nutting Avenue. |
| Readio, Philip Adna, | Florence, | 120 Pleasant Street. |
| Redding, George Kenneth, | Melrose, | 29 Pleasant Street. |
| Reed, Morris,[1] | Worcester, | 73 Pleasant Street. |
| Richards, George Henry, | Springfield, | 15 Phillips Street. |
| Richardson, Mark Morton, | North Dana, | 8 Nutting Avenue. |
| Roberts, Ivan Andrew,[1] | South Lee, | 3 McClellan Street. |
| Robertson, Lafayette Janes, Jr.,[1] | Hartford, Conn., | 29 Pleasant Street. |
| Robertson, William Fenton,[1] | Framingham, | 53 Lincoln Avenue. |
| Sanborn, Joseph Raymond,[1] | North Amherst, | North Amherst. |
| Sanderson, Ralph Hemmenway, | Waltham, | 42 McClellan Street. |
| Schandelmayer, Ralph Ernest,[1] | Marlborough, | Stockbridge Hall. |
| Scott, Clifton William,[1] | Buckland, | 14 Nutting Avenue. |
| Shaughnessy, Howard John, | Easthampton, | 17 Phillips Street. |
| Silverman, Joseph,[1] | Dorchester, | 5 Nutting Avenue. |
| Simmons, Lester Winslow, | Dighton, | 75 Pleasant Street. |
| Smith, Donald Hiram,[1] | Pittsfield, | 77 Pleasant Street. |
| Smith, Fred George, | Otter River, | 72 Main Street. |
| Smith, George Alfred, | Whitinsville, | Lincoln Avenue. |
| Smith, Herbert Thatcher, | Atlantic, | Sunny Villa. |
| Smith, Raymond Archer,[1] | Maynard, | 35 East Pleasant Street. |
| Smith, Raymond Newton,[1] | Plainville, | 35 East Pleasant Street. |
| Smith, Susan Almira, | Great Barrington, | M. A. C. Farm House. |
| Snow, John Dow,[1] | Arlington, | 77 Pleasant Street. |
| Spencer, William, | Worcester, | McClure Street. |
| Steacie, Curtis, | Framingham, | 17 Phillips Street. |
| Stedman, Ralph Shaw,[1] | Springfield, | 15 Phillips Street. |
| Stiles, William Burling, | Great Barrington, | 4 Chestnut Street. |
| Strecker, Edmund Herman, | New York, N. Y., | 3 McClellan Street. |
| Sullivan, Walter Mitchell,[1] | Lawrence, | Lincoln Avenue. |
| Sumner, Ralph Martin, | Springfield, | 35 East Pleasant Street. |
| Sweeney, Frank Joseph, | Whitman, | 12 Cottage Street. |
| Talmage Harry John, | Alford, | 21 Amity Street. |
| Taylor, Elliot Hubbard, | Shelburne, | North Amherst. |
| Taylor, Thornton Greenwood, | Brookline, | 103 Butterfield Avenue. |

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[1] Work incomplete.

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|---|---|---|
| Torrey, Converse Hall,[1] | Williamstown, | 25 Pleasant Street. |
| Turner, Alfred William,[1] | Santo Domingo, | 53 Lincoln Avenue. |
| Urquhart, John Wardrop | East Walpole, | Hallock Street. |
| Vigezzi, John Dellea, | Great Barrington, | 75 Pleasant Street. |
| Vigezzi, Mary Theresa, | Great Barrington, | M. A. C. Farm House. |
| Ware, Mason,[1] | Malden, | 6 Phillips Street. |
| Waugh, Frederick Vail, | Amherst, | Amherst. |
| Webster, Milton Fuller,[1] | Malden, | 73 Pleasant Street. |
| Willis, Maud Ethel,[1] | Amherst, | 13 Cottage Street. |
| Woodward, Ralph, Jr.,[1] | Grafton, | 7 Nutting Avenue. |
| Wright, Kenneth Yerxa,[1] | Arlington, | 77 Pleasant Street. |
| Wright, Stuart Eldridge, | Taunton, | 53 Lincoln Avenue. |

## UNCLASSIFIED STUDENTS.

| | | |
|---|---|---|
| Allen, Arthur Frederic, | Boston, | The Perry. |
| Avery, Humphrey Roger, | Patchogue, N. Y., | 86 Pleasant Street. |
| Berry, Fred Mitchell,[1] | Lynnfield Center, | 120 Pleasant Street. |
| Blanchard, Margery Elizabeth, | Linwood, | 79 Pleasant Street. |
| Bridgman, Ralph Scofield, | Westhampton, | 60 Pleasant Street. |
| Buck, Paul Ten Hagen, | La Grangeville, N. Y., | 6 Allen Street. |
| Campbell, John Collins, | Gardner, | 35 North Prospect Street. |
| Clancy, Henry Gregory,[1] | Natick, | 35 North Prospect Street. |
| Cross, Robert Earle, | Agawam, | 21 Fearing Street. |
| Curran, Ralph Aloysius, | East Boston, | 5 Allen Street. |
| Davis, Edwin John, | Holyoke, | 35 East Pleasant Street. |
| Emerson, Caroline Dwight, | Amherst, | 21 Northampton Road. |
| Floersh, Mary Frances, | Nashville, Tenn., | Draper Hall. |
| Giles, John Farrar, | South Lincoln, | 1 Cottage Street. |
| Grundler, Adolph Joseph, | Lowell, | Poultry Plant. |
| Harris, Warren Timothy, | Millbury, | 60 Pleasant Street. |
| LaPoint, Wilfred John, | Greenfield, | 6 Allen Street. |
| Messmer, Robert Frederick, | Milwaukee, Wis., | 10 Allen Street. |
| Morton, Leander Paul | Amherst, | Lincoln Avenue. |
| Norris, Harold Allison,[1] | Amherst, | Birch Lawn. |
| Novitski, Joseph Francis, | Amherst, | Amherst. |
| Palmer, Philip Leonard, | Springfield, | Lincoln Avenue. |
| Rollins, Eva Isolde, | Amherst, | 21 Main Street. |
| Rucker, Harriett Evans, | Amherst, | 5 School Street. |
| Scott, John Edmund, | Fort Wayne, Ind., | 6 Allen Street. |
| Searls, Edward Marlborough, | Schaghticoke, N. Y., | North Amherst. |
| Watson, Hawkesworth Douglas, | Walpole, | 5 Allen Street. |
| Whitman, Luther Oakes, | Amherst, | 29 Pleasant Street. |
| Woods, Frank Archibald, | Groton, | 83 Pleasant Street. |

## VOCATIONAL POULTRY STUDENTS.

| | | |
|---|---|---|
| Alden, Margaret E., | Abington, | 17 Kellogg Avenue. |
| Anderson, Ernest Emil, | Medford, | 7 Nutting Avenue. |
| Andrews, Nelson Irving, | Hyde Park, | 35 East Pleasant Street. |
| Churchill, Oliver Claude, | West Somerville, | 44 Triangle Street. |
| Coleman, Moses Milton, | Mendon, | Farview Way. |
| Fitzgerald, Albert Joseph, | Braintree, | Poultry Plant. |
| Hallock, Genevieve, | Westborough, | 4 Chestnut Street. |
| Savage, John Batcheller, | Cambridge, | 12 Nutting Avenue. |

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[1] Work incomplete.

### GEOGRAPHICAL SUMMARY.

| | |
|---|---|
| Massachusetts, | 567 |
| Connecticut, | 27 |
| New York, | 25 |
| New Jersey, | 16 |
| Indiana, | 7 |
| Pennsylvania, | 5 |
| Rhode Island, | 5 |
| New Hampshire, | 4 |
| Vermont, | 4 |
| Maine, | 3 |
| Michigan, | 3 |
| Tennessee, | 3 |
| Missouri, | 2 |
| Canada, | 2 |
| Wisconsin, | 2 |
| California, | 1 |
| District of Columbia, | 1 |
| Kansas, | 1 |
| Maryland, | 1 |
| Mississippi, | 1 |
| Montana, | 1 |
| Ohio, | 1 |
| South Carolina, | 1 |
| Texas, | 1 |
| Virginia, | 1 |
| China, | 1 |
| Cuba, | 1 |
| France, | 1 |
| India, | 1 |
| Santo Domingo, | 1 |
| Total, | 690 |

### SUMMARY BY CLASSES.

| | |
|---|---|
| Graduate students, | 67 |
| Senior class, 1917, | 104 |
| Junior class, 1918, | 138 |
| Sophomore class, 1919, | 174 |
| Freshman class, 1920, | 170 |
| Unclassified students, | 29 |
| Vocational poultry students, | 8 |
| Total registration, | 690 |

# SHORT COURSE STUDENTS, 1916.

## THE TEN WEEKS' COURSE.

| | |
|---|---|
| Ahrens, George, | Springfield. |
| Allen, Wm. R., | Maylan, Pa. |
| Alvarez, Frederic G., | Springfield. |
| Anderson, Ernest, | Amherst. |
| Archambo, David P., | Griswoldville. |
| Bailey, Roland S., | Kingston. |
| Beaman, Lawrence H., | Leverett. |
| Bent, Whitney J., | Maynard. |
| Bertolf, August C., | Greenwich. |
| Bisbee, P. E., | Amherst. |
| Blackmer, John W., | Orange. |
| Blackwelle, Malcolm G., | Fairhaven. |
| Blake, Robert A., | Wollaston. |
| Brady, James, | Petersham. |
| Brooks, Roger E., | Worcester. |
| Bryan, Lester W., | Worcester. |
| Buckley, John, | Newburyport. |
| Burt, Gordon E., | Plainfield. |
| Carley, Mrs. H. S., | Amherst. |
| Chadwick, John T., Jr., | West Boxford. |
| Challet, Fred E., | Northampton. |
| Chamberlain, Harlan E., | Abington. |
| Cheney, Waldo E., | Dedham. |
| Childs, Alexander G., Jr., | Dorchester. |
| Clapp, Robert, | Northampton. |
| Cole, E. Francis, | Dedham. |
| Cole, Emma M., | Dedham. |
| Corbin, Erford H., | Palmer. |
| Coristine, Mrs. Mary S., | Amherst. |
| Coristine, Walter H., | Amherst. |
| Cox, Ralph E., | Wakefield. |
| Crocker, John A., | Newton. |
| Cromack, Leslie G., | Bardwell's Ferry. |
| Cudworth, Robert P., | Melrose Highlands. |
| Dana, Carlos E., | Oxford. |
| Daniels, George H., | Newton. |
| Davidson, Harold J., | Auburn. |
| Delvey, Ernest, | Turners Falls. |
| Doran, Albert J., | Lynn. |
| Dorling, Herbert, | Spencer. |
| Downey, Clifton W., | Maynard. |
| Dragon, Raymond, | Northampton. |
| Dunn, Ralph C., | Mattapoisett. |
| Durant, Herbert R., | Leverett. |
| Durfee, Volney L., | Bristol. |
| Emerson, Carl E., | Waltham. |
| Erickson, Harry, | Westford. |
| Erikson, Paul F., | Rockland. |
| Estes, Lawrence H., | Windsor. |
| Ewing, Stanley M., | Easthampton. |
| Farrell, Thomas E., | Pittsfield. |

| | |
|---|---|
| Fay, Allen M., | Watertown. |
| Ferris, Adaline L., | Ridgefield Park, N. J. |
| Fiske, Wm., | Northampton. |
| Frye, Howard S., | Lunenburg. |
| Fuller, Sears, | Roxbury. |
| Gale, George T., | Springfield. |
| Galusha, G. Newell, | Williamstown. |
| Gillette, Kent, | Collinsville. |
| Grant, Gladys M., | Brockton. |
| Groff, Paul W., | Amherst. |
| Hammond, Burton H., | Onset. |
| Hanrahan, John B., | Lawrence. |
| Hansburg, Philip, Jr., 2d, | Hartford, Conn. |
| Hardy, Fred C., | Lancaster. |
| Harrington, Carl R., | Lunenburg. |
| Harris, W. T., | Millbury. |
| Heine, Mrs. Helen M., | State Line. |
| Higgins, Robert H., | Arlington. |
| Hildreth, Leon F., | Westford. |
| Hold, Mrs. Mabel B., | Princeton, Me. |
| Hold, Ralph E., | Oxford. |
| Holmes, Orlando D., | North Billerica. |
| Hook, Homer M., | Reading. |
| Howard, Wm., | Northampton. |
| Hoxie, Asa S., | Mattapoisett. |
| Hurlbutt, Horace C., Jr., | Westport. |
| Jauncey, Wm., | Groton. |
| Johnson, Robert B., | Westborough. |
| Johnson, Roy L., | Geneva, Ohio. |
| Keith, Willard F., | Worcester. |
| Kellogg, Daniel F., | Sheffield. |
| Kendall, Waldo W., | Hadley. |
| Kenner, Edward M., | Springfield. |
| Ladd, Charles M., | Springfield. |
| Lataner, Harry, | Columbia, Conn. |
| Latham, John C., | Boston. |
| Leary, Edward, | LaReville. |
| Lefevre, Oscar H., | Jamaica Plain. |
| Le Geyt, Judson H., | Barkhamsted, Conn. |
| Lerner, Philip A., | Peru. |
| Lifter, Eli W., | Hamilton. |
| Lindsley, Horace N., | Orange, N. J. |
| Locke, John W., | Salem. |
| Lord, John H., | Maynard. |
| Lowney, Daniel W., | Maynard. |
| MacDaniel, L. O., | Ashfield. |
| MacDonald, Harold R., | Amherst. |
| Martin, Orville D., | Lunenburg. |
| Maxwell, Helen, | Brookline. |
| McCallum, John, | Northampton. |
| McIntyre, Clark, | Springfield. |
| McLaughlin, Edward, | Hingham. |
| McLearn, Robert, | Holliston. |
| McManus, Mark A., | Lawrence. |
| Melrose, Fred, | Brookfield. |
| Mentor, Ramon B., | Amherst. |
| Miller, Donald H., | East Bridgewater. |
| Miller, Hugh, | Leeds. |
| Mitchell, David, | Springfield. |
| Morse, Clifford, | Northampton. |
| Murray, Harold, | Amherst. |
| Norris, Mrs. Elizabeth E., | Amherst. |
| O'Leary, Francis, | Holliston. |
| Perry, Gardner, Jr., | Dedham. |

| | |
|---|---|
| Priest, Donald L., | Gleasondale. |
| Prouty, Ellis F., | Amherst. |
| Reoch, Alfred, | Southborough. |
| Richardson, B. K., | Middleton. |
| Richardson, Leroy M., | Winchester. |
| Rowley, C. A., | Paxton. |
| Russell, Helen W., | Washington, Conn. |
| Rust, Phillip, | Northampton. |
| Samaniego, Luis, | Boston. |
| Savage, Arthur A., | Philadelphia, Pa. |
| Scales, Mrs. Richmond P., | Still River. |
| Scott, Lyndon, | Whately. |
| Seemann, Frieda, | Boston. |
| Shaw, Leslie, | Northampton. |
| Sheridan, Kathleen, | Winchester. |
| Smith, Martin M., | White Valley. |
| Trowbridge, Virginia H., | New Haven, Conn. |
| Tufts, Ellen, | Rockport. |
| Turner, Willis G., | North Reading. |
| Vaughan, Carl, | Shrewsbury. |
| Ward, Harold, | Amherst. |
| Warfield, Howard L., | Buckland. |
| Warren, Albert P., | Groton. |
| Waterman, Fred T., | Scituate. |
| Wesson, R. W., | Grafton. |
| Wheeler, Sol, | Bantam, Conn. |
| Whitcomb, Howard R., | Lunenburg. |
| Whitcomb, R. Oswald, | West Boylston. |
| Wilbur, W. A., | Pittsfield. |
| Winter, Oliver A., | West Roxbury. |
| Wright, Edna, | Springfield. |
| Wright, John B., | Oxford. |
| Wright, Winthrop A., | Billerica. |

## Summer School of Agriculture and Country Life.

| | |
|---|---|
| Abbott, W. J., | Danvers. |
| Adams, Ida M., | Revere. |
| Agard, Mary C., | South Hadley. |
| Allen, Mrs. Lois J., | Amherst. |
| Andrew, Pauline M., | North Adams. |
| Andrews, Gracy C., | Amherst. |
| Archibald, Florence, | Lowell. |
| Armstrong, Mary C., | Brooklyn, N. Y. |
| Austin, Fannie E., | Leominster. |
| Austin, Idah R., | Boston. |
| Bacon, Hazel, | Meriden, Conn. |
| Baker, Miss L. H., | Newton Lower Falls. |
| Baker, Mrs. Warren S., | Fort Landerdale, Fla. |
| Bartlett, Alice G., | Worthington. |
| Bennett, Marion E., | South Meriden, Conn. |
| Bird, Anna W., | Wilmington, Del. |
| Brennan, E. Dorothy, | Melrose. |
| Broad, Gertrude F., | Gloucester. |
| Butcher, Carolyn M., | Roxbury. |
| Butcher, Gertrude, | Boston. |
| Caldwell, Saidee H., | Bridgeport, Conn. |
| Campbell, Bertha M., | East Windsor. |
| Capen, Elida M., | Spencer. |
| Carlton, Louise E., | Williamstown. |
| Carroll, Lillian M., | Rockville, Conn. |
| Carver, Katharine, | Meriden, Conn. |
| Chase, Florence E., | Sturbridge. |
| Cold, Bertha, | Yonkers, N. Y. |

| | |
|---|---|
| Comins, Esther M., | Amherst. |
| Comins, Lucia, | Amherst. |
| Comins, Mildred L., | Amherst. |
| Conway, Mary H., | Dorchester. |
| Cook, Mary E., | Conway. |
| Cooper, Caro L., | Chelsea. |
| Coristine, W. H., | Amherst. |
| Coristine, Mrs. W. H., | Amherst. |
| Cotter, W. Francis, | Cambridge. |
| Crosskill, E. Gladys, | Wrentham. |
| Cummings, Mary F., | Boston. |
| Currie, Mrs. Rose H., | Cambridge. |
| Davis, Caroline M., | Reading. |
| Derby, Dorothy, | Arlington. |
| Donovan, Nellie C., | Turners Falls. |
| Dudgeon, H. N., | Boston. |
| Dyer, Gertrude W., | Provincetown. |
| Dykenan, Grace E., | Chelsea. |
| Elwell, Hazel M., | Keene, N. H. |
| Elwell, Susan W., | Danvers. |
| Epstein, Anna, | Amherst. |
| Eustis, Florence M., | Wellesley Hills. |
| Eustis, Helen, | Newton. |
| Fenstel, Edith S., | South Hadley Falls. |
| Field, Florence E., | Abington. |
| Fisher, Claribel P., | Natick. |
| Fitz, Robert F., | Beach Bluff. |
| Fitzgerald, A. J., | Braintree. |
| Floersh, Miss M., | Amherst. |
| Foster, Elliott O., | Essex Junction, Vt. |
| French, Alice M., | Lowell. |
| Gavin, Gertrude L., | Roxbury. |
| Gavin, Madeline R., | Roxbury. |
| Giles, Mrs. Lucy M., | Westminster. |
| Gillett, Esther A., | Tilton, N. H. |
| Gleason, Gertrude E., | Newton Highlands. |
| Gleason, Mrs. Linette D., | Newton Highlands. |
| Goessmann, Mary F., | Amherst. |
| Goodale, Eula P., | Fairhaven. |
| Grant, Editha M., | Salem. |
| Grenier, Gladys, | Baltimore, Md. |
| Greninger, Louise C., | Bridgeport, Conn. |
| Hagarty, Anne S., | Dorchester. |
| Hammond, Grace de W., | Haverhill. |
| Harding, Mrs. F. M., | East Longmeadow. |
| Harding, Pearl M., | East Longmeadow. |
| Harrington, Mabel A., | North Adams. |
| Harris, Edna M., | Meriden, Conn. |
| Harrison, Geo., | New York, N. Y. |
| Hill, Amelia M., | Brooklyn, N. Y. |
| Holman, Hilda, | Woburn, Mass. |
| Hore, Amy, | New York, N. Y. |
| Hovenden, Lena F., | Newtonville. |
| Howe, Florence, | Leominster. |
| Hunt, Emma A., | Framingham. |
| Ingraham, Ida M., | Holyoke. |
| Jencks, Martha A., | West Somerville. |
| Johnson, Phyllis M., | Amherst. |
| Jones, Helen P., | Waltham. |
| Jorgensen, George A., | Waverley. |
| Josselyn, Abbie P., | Allston. |
| Kalfur, Anna, | Richmond Hill, N. Y. |
| Keith, Lucy E., | Gardner. |
| King, Alice W., | Taunton. |

| | |
|---|---|
| Kingman, Miriam R., | Somerville. |
| Labrovitz, Rose, | Amherst. |
| Lambert, Marjorie W., | Milledgeville, Ga. |
| Lance, Eva E., | South Meriden. |
| Lang, Elizabeth, | Woodhaven, N. Y. |
| Lathrop, Florence B., | Reading. |
| Lawrence, Ethel F., | Ashby. |
| Leete, Cora B., | Springfield. |
| Levin, Ethel H., | Amherst. |
| Lewis, Alice, | Meriden, Conn. |
| Lin, T. Y., | Amherst. |
| Litch, John H., | New London, N. H. |
| Loomis, Miss C. V., | Winchester. |
| Lundin, Enor, | Quincy. |
| Ly, J. Usang, | West Philadelphia, Pa. |
| MacDougall, Mrs. A. F., | Northampton. |
| Malone, Mary S., | Wilmington, Del. |
| Middleton, George B., | Winthrop. |
| Miller, Elizabeth, | Brookline. |
| Miller, Fred., | Lynn. |
| Mitchell, Edward A., | Coppahosie, Va. |
| Morse, Myrtie E., | Wellesley. |
| Nagle, Elizabeth K., | Brookline. |
| Nahmer, Miss C. D., | Springfield. |
| Neale, W. G., | Lynn. |
| Newell, Lena E., | Bridgeport, Conn. |
| Newton, Georgianna M., | Worcester. |
| Niles, Caleb H., | East Lynn. |
| North, Miss L. V., | Bradford. |
| Nye, Mary E., | Hingham. |
| O'Brien, William S., | Greenwich, Conn. |
| Osborne, Ethel B., | Salem. |
| Pfaelzer, Howard R., | Boston. |
| Pincus, Mrs. J. W., | New York, N. Y. |
| Pond, Anna H., | Milford. |
| Reed, Henry R., | Arlington. |
| Reed, Julia, | Boston. |
| Reineche, Theo. G. W., | Amherst. |
| Rhodes, Sara L., | Brooklyn, N. Y. |
| Richardson, Alice S., | Norwood. |
| Richardson, Ella L., | Weston. |
| Robinson, Nathan H., | Braintree. |
| Roche, Julia P., | Salem. |
| Rogers, Geo. A., | Jamaica, N. Y. |
| Rudd, Daisy P., | Bennington, Vt. |
| Ruggli, Clara W., | Cambridge. |
| Ryan, Bridget A., | Sunderland. |
| Sanford, Mary E., | Plainfield. |
| Shaddick, George, | Everett. |
| Simmons, Eva L., | Bedford. |
| Smith, Jeannette, | Woburn. |
| Spokesfield, Mrs. E. M., | Islington. |
| Stone, C. H., | Brookline. |
| Stoughton Miss L. M., | Winchester. |
| Sweeten, Mrs. Almira, | Baltimore, Md. |
| Swift, Mary E., | Easton. |
| Temple, Myrtle G., | North Adams. |
| Terry, Mrs. Julia S., | Plainfield. |
| Thompson, A. S., | Amherst. |
| Thompson, D. V., | Lawrenceville, N. J. |
| Turner, Mrs. Mary, | South Meriden, Conn. |
| Van Auken, Susie M., | Brockton. |
| Walker, Mary A., | Hatfield. |
| Waterman, Edith G., | Lowell. |

| | |
|---|---|
| Watson, Mary R., | Plymouth. |
| Waugh, Dorothy, | Amherst. |
| Waugh, Esther, | Amherst. |
| Welch, Kate A., | Worcester. |
| Welch, Mary J., | Worcester. |
| West, Helen K., | Brockton. |
| Wheeler, W. E., | Pleasant Hill, Tenn. |
| White, Helena, | Amherst. |
| Whitney, Shirley, | Leominster. |
| Wilcox, Gertrude, | Mattapan. |
| Wilkins, Marion, | Newtonville. |
| Willis, Dora F., | Ashfield. |
| Willis, Edith, | Brockton. |
| Wood, Annie D., | Webster. |
| Wright, Alice L., | New Haven, Conn. |
| Yost, Emma L., | Meriden, Conn. |

### School for Rural Social Service.

| | |
|---|---|
| Barker, George A., | New Salem. |
| Blanchard, Miss S. A., | Fitchburg. |
| Cardall, A. J., | Orange. |
| Dalton, Mary E., | Northfield. |
| Dwight, Clara B., | South Amherst. |
| Eastman, Frances M., | Amherst. |
| Estabrook, Mary V., | Lunenburg. |
| Fletcher, Lizzie E., | Three Rivers. |
| Garfield, Miss A. M., | South Ashburnham. |
| Gleason, Elizabeth, | Burnside, Conn. |
| Hastings, Mrs. Mary E., | Hadley. |
| Howlett, Cora, | South Amherst. |
| Hudson, Clara E., | Plainfield. |
| Jackson, Ethel F., | Springfield. |
| Johnson, Pearl M., | Westfield. |
| Jostlyn, May L., | Brier. |
| Kendall, Amelia, | Springfield. |
| Mack, Mary E. M., | Wilbraham. |
| McConnell, Mary, | Quincy. |
| Merrill, James G., | Lake Helen, Fla. |
| Moore, Bessie, | Northfield. |
| Moore, Harriet C. | Holden. |
| Moore, Ruth E., | Northfield. |
| Powers, Eilene, | Leominster. |
| Powers, Elsie W., | Leominster. |
| Reed, James P., | Hadley. |
| Shaw, Ethel, | South Amherst. |
| Smith, Grace C., | Springfield. |
| Snyder, Mabel C. | Plainfield. |
| Thacher, Olive W., | Beverly. |
| Treworgy, Everett S., | Ashby. |
| Van Der Hoop, Nannette C. W., | Gay Head. |
| Van Der Hoop, Pauline, | Gay Head. |
| Wellington, Catharine J., | Waltham. |
| White, Anna C., | North Hadley. |
| Wilson, Joseph D., | Philadelphia, Pa. |
| Woods, Mary B., | Hatfield. |

### Apple Packing School.

| | |
|---|---|
| Bean, Arthur H., | Florence. |
| Burdett, A. E., | Smiths Ferry. |
| Clark, George, | Tolland. |
| Lane, Wm. C., | Cambridge. |
| Lathrop, B. M., | Pittsfield. |

| | |
|---|---|
| Mason, W. B., | Wrentham. |
| Mathers, Robert, | Williamsburg. |
| Wharton, Wm. P., | Groton. |

### Beekeepers' School.

| | |
|---|---|
| Bell, Mary, | Bay Side, Long Island, N. Y. |
| Bellamy, Mrs. John, | Dorchester. |
| Cole, E. Frances, | Dedham. |
| Coristine, W. H., | Amherst. |
| Floersh, Miss M., | Amherst. |
| Russell, Helen W., | Washington, Conn. |
| Scott, Russell, | East Alstead, N. H. |
| Sheridan, Kathleen, | Winchester. |
| Stanley, Mary B., | West Hartford, Conn. |
| Trowbridge, Virginia H., | New Haven, Conn. |

## ADDENDUM TO PAGE 31.

**Additional entrance credit in agriculture may be allowed in individual cases, if recommended and authorized by the Division of Agriculture of the college. Early application to the head of the Division is advisable, and schools likely to present such candidates are urged to correspond with this officer at once, that the necessary investigation and inspection may be made in time.**

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Public Document No. 31

# FIFTY-FOURTH ANNUAL REPORT

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE.

## PART I.

## REPORT OF THE PRESIDENT AND OTHER OFFICERS OF ADMINISTRATION

FOR FISCAL YEAR ENDED NOV. 30, 1916.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1917.

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Publication of this Document
approved by the
Supervisor of Administration.

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# The Commonwealth of Massachusetts.

Massachusetts Agricultural College,
Amherst, Dec. 1, 1916.

To His Excellency Samuel W. McCall.

Sir: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part I. of the fifty-fourth annual report of the trustees, for the fiscal year ended Nov. 30, 1916, this being the report of the president of the college and other officers of administration to the corporation.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
*President.*

# REPORT OF THE PRESIDENT OF THE COLLEGE.

*Gentlemen of the Corporation.*

I herewith submit my annual report as president of the Massachusetts Agricultural College, and with it transmit reports from the other administrative officers of the institution.

## AN ADEQUATE PLAN OF FINANCIAL SUPPORT FOR THE MASSACHUSETTS AGRICULTURAL COLLEGE.

The most serious question which the college has to face at the present time is that of sufficient and permanent financial support. Many problems of teaching, investigation, administration, courses of study, are being carefully studied by the staff of the institution; but in nearly every instance the individual or the committee which is considering any one of these problems discovers that its final solution is largely dependent upon sufficient funds.

Since 1900 the college has not only grown steadily in enrollment of students, but there has been an even more striking development in the range and scope of its varied activities. Recent legislative appropriations for current maintenance have not been niggardly. The resolve passed by the Legislature of 1913 granting a five years' appropriation for maintenance, increasing progressively each year, was gratifying not only because of the amounts involved but even more because it has enabled the college to plan with some degree of system and foresight. Nevertheless, a considerable proportion of the advantages gained by this resolve were vitiated by the fact that not only was no equivalent provision made for permanent improvements, such as buildings, but that it has been necessary to pay for certain permanent improvements out of current funds, — a plan wholly indefensible from the standpoint of good accounting, and unfortunate in that it drew heavily on funds sorely needed for other purposes.

Although enlarged appropriations for current support are much needed, provision for permanent improvements is perhaps just now our chief financial question. The college for years was woefully lacking in adequate buildings. Indeed, the material equipment of the college for the first thirty-five years of its history was really pathetic in its meagreness. Up to 1900 the college did not possess a single building of brick or stone planned for or adapted to teaching purposes. The three wooden structures then in use for teaching are now inventoried at less than $20,000; one of these, erected in 1867, still serves as an excuse for a chemical laboratory; a fourth wooden structure, the drill hall, was built about 1883. Several departments were given extremely meagre accommodations in one of the dormitories. As late as 1904 the little frame "botanic museum" of one story and with two or three small rooms upstairs accommodated all the horticulture, all the botany, as well as the treasurer. Since 1904 several modern and well-equipped brick buildings have been added, but, even so, only one really large building has been built in the history of the college, namely, Stockbridge Hall, which houses the various departments of the Division of Agriculture. Other large buildings, such as a library, a chemical laboratory, an armory and gymnasium, should be built at once. The present housing for these features of our work is little short of disgraceful, and would not be tolerated in an endowed institution of any standing whatever. *The college is to-day at least ten years behind its proper building program.* We could amply justify an immediate expenditure of a million dollars for buildings.

### An Agricultural College and Nothing Else.

The action of the Legislature in appointing a Commission on Agricultural Education apparently raised no questions concerning the fundamental purpose of the college. It seems to be assumed that the college is solely an agricultural college. But I am persuaded that many legislators and citizens do not appreciate the scope of the work of a modern agricultural college, nor the great need for trained, paid leadership in agricultural affairs. The insistence by some that the college should graduate only working farmers shows a lack of vision of the present and future needs of agriculture. Yet it seems clear that both the people and the Legislature assume that we are an agricultural college and nothing else. At any rate, that is our assumption. We may err in our methods of getting results, but we are loyal to agricultural advancement as the main task of the college. It hardly seems necessary to reiterate this fact.

Still, there is more or less agitation for a State university in Massachusetts. Informally, and largely from individuals, suggestions are occasionally made that this college might be the nucleus for such an institution. A variation of this proposal is that our college should offer preparation for many other fields than agriculture and country life, — become both in fact and in name "The Massachusetts State College." Doubtless the Morrill Act of 1862 gives ample legal warrant for either policy. Aside from the institutions for colored students, 22 of the "land-grant" institutions are either State universities or are attached to State universities established prior to 1862, while 26 are agricultural and mechanical colleges separate from State universities. In Massachusetts, at the very outset, "mechanic arts" was taken over by the Massachusetts Institute of Technology. The Massachusetts Agricultural College stands unique among the sisterhood of public institutions of higher learning established by the Morrill Act of 1862 in that it is not connected with a State university and that it deals with agriculture alone. It is the only institution of collegiate grade in America which may be called strictly an agricultural college and nothing else.

Whatever Massachusetts may decide with reference to new State-supported educational institutions of higher grade, I trust that the Massachusetts Agricultural College may be left to develop as an agricultural college solely, with funds sufficient to place and keep it in the very front rank of agricultural colleges. There are unique advantages in a policy of exclusive devotion to the rural problem. The field is wide enough for all our energies and important enough for warranting our best efforts.

In my report for 1911 I dwelt at some length upon the purpose of the college as I interpret it, emphasized our desire to keep it strictly an agricultural college, and stated strongly our opposition to any movement that may seek to work it over into a State university. I hope that the present statement may set forever at rest any intimations or suspicions that our purpose is to make of this institution anything else than a college of agriculture.

### The Argument for Support from the Standpoint of the State.

Sometimes I fear that it has become the habit of the Legislature to think of the college as in a sense a beggar, or at least a suppliant for State aid. On the other hand, it may be possible that college officers concern themselves too little about what the State can afford. There can be no doubt that the real test of the need of an educational institution is its service to the State. In our case it may be asked, first, to what extent is the institution serving the State? Secondly, in view of this service, how much can the State afford to spend upon that particular type of service?

The support of an agricultural college must be viewed largely as a matter of productive investment on the part of the State. The annual value of the agricultural production in Massachusetts will soon be in the neighborhood of a hundred million dollars. In this day of scientific study, any corporation that did a business of a hundred million dollars a year would, I am sure, think it a very modest investment if it devoted one-fifth of one per cent. of its annual product each year to investigations concerning improvements in its business. Individual farmers cannot make elaborate investigations. Practically the only place where these can be made is at the agricultural college. The State is in some sense a corporation doing its business in agriculture through individual farmers who own the land and do the work. It might be desirable if this annual value could be taxed so that a portion of it would be used for investigational work, but that is impracticable. The State must consider itself as the beneficiary of increased agricultural productivity, and should invest money in agricultural investigation. This small investment of one-fifth of one per cent. of the annual value of agricultural products in Massachusetts would yield $200,000 a year for study of agricultural problems, as against the $30,000 now appropriated by the State for this purpose.

Let us look at the matter of support from another point of view. Suppose the college eventually costs the Commonwealth a million dollars a year. This would mean, at the present assessed valuation of the State, that a citizen whose property is assessed at $5,000 would contribute $1 a year for the support of the college. If the college is in any measure efficient in its work, is there any citizen of the Commonwealth who would be imposed upon if he made a contribution on this basis?

Consider the general value of the State-wide educational work which the college carries on. No one can measure the money value of such an educational work or put it in terms of dollars and cents. We can only point out some of the returns that come to the Commonwealth. The test of our usefulness to the State is not alone our usefulness to the farmer. We serve the entire Commonwealth for such reasons and in such ways as the following: —

1. By helping urban communities to gain an adequate food supply, through larger productivity of the land and through better quality of products.

2. By assisting in securing economical means of food distribution, so that both producers and consumers will be benefited thereby.

3. By aiding, to an increasing degree, workingmen who wish to live on the land while still earning wages in some industrial occupation.

4. By assisting in the development of agricultural educational values for the children of the Commonwealth. It is doubtful if the people of the State realize the educational gains that came to the children in the schools of the State last year when nearly 50,000 boys and girls were enrolled in agricultural clubs of various sorts.

5. By assisting in securing a better farm life, as a part of the common life of the State. If the college does its work well, it will assist materially in the upbuilding of well-developed

rural communities, and thus help in maintaining a better type of people on the land.

For such reasons as these the Commonwealth, in its support of an agricultural college, makes a definite investment that gives real, even if not easily measured, returns to the State as a whole. I do not stop here to urge the fundamental value of the college to agriculture itself, to the farmers and their families. That value is here assumed. Too seldom do we urge the fact that the college is an asset of the State as a whole.

As a practical question, it should not be forgotten that for various reasons the income from Federal grants for agricultural college work is not relatively so great in Massachusetts as it is in most other States. The reasons for this do not need to be presented at this point, but the fact remains and has a bearing upon the extent to which the State, in order to do as well by its agricultural college as other States do, must make up the deficiencies in Federal appropriations.

### Needs from the Institutional Point of View.

Our report of a year ago discussed rather fully our needs for permanent improvements. These may be reviewed very briefly here.

1. *Land.* — Through the acts of the last Legislature the college is now enabled to purchase, out of current funds, certain much-needed parcels of land on which it has had options for some years; but it is perfectly clear that as the years go by the college will need considerably more land. The experience of all agricultural colleges has demonstrated that an institution of this sort can hardly have too much land. More and more the land is used for laboratory or educational purposes, as well as for demonstrations, tests and experiments. We should have from five to ten thousand dollars a year for some years to come, to use for land purchases as the situation dictates and as the trustees may determine. The experiment station alone should acquire during the next five or six years not less than 125 or 150 acres of land. Even a cursory examination of its present areas demonstrates that they are ridicu-

lously inadequate. I call your attention to the very clear and emphatic statement of Director Brooks in his report (see page 60) on this point.

2. *Buildings.* — I am sure that one who carefully surveys the equipment of the college must agree that the situation amply justifies large expenditures for buildings within the next two or three years. As one prominent citizen of the State phrased it not long ago in looking over the decrepit building that at present houses our department of chemistry, "It is a disgrace to the State." He was nearly as emphatic with respect to the existing library facilities. It will prove difficult, if not entirely impossible, to take advantage of the new congressional act relative to military drill unless we have a new armory. For at least five years we have cherished the hope of soon affording adequate physical education for every student in college. It is quite out of the question even to attempt such a development without a new gymnasium. Some important departments of the college, such as English, for example, have no headquarters. The department of economics has been moved half a dozen times in as many years, and to-day has no abiding place. It is obvious that the best work cannot be done under such conditions. The housing of students becomes more unsatisfactory every year. We are asking the Legislature this year, for the seventh time, for a dormitory. The college was organized and was carried on for thirty years on a dormitory basis. Fewer students are accommodated in dormitories than was the case twenty years ago, when the college had only one-sixth the number of students it has to-day.[1]

3. *Miscellaneous Improvements.* — There is constant need for minor improvements of various kinds, for new equipment for teaching and practical purposes, and for the replacement of the more expensive equipment. These additions should not be charged against current maintenance. They add to the in-

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[1] Buildings needed at once and in near future: completion of power plant, library, chemistry building, armory and gymnasium, completion of infirmary, completion of rural engineering shops, completion of laboratory for physics and microbiology, service building for pomology, remodeling Stockbridge house and cottage, greenhouses (floriculture), market-garden buildings, horticulture (miscellaneous buildings), poultry building, rural arts building for department of landscape gardening, administration building, building for humanities and rural social service, buildings for women (domestic science laboratory), dormitories for men and women.

ventory of the institution, and should be provided out of funds set aside for that purpose. Unfortunately, it has become necessary during the past two or three years to encroach upon our current income for the making of certain improvements and the purchase of equipment absolutely necessary for the work of the institution.

The sum of $200,000 a year for some years to come, certainly for not less than six, should be regarded as a minimum sum for buildings and other permanent improvements at the institution.

### Maintenance.

*Investigation.* — Permanent agricultural improvement is based on scientific investigation. The State of Massachusetts is now contributing something like $30,000 a year for this purpose. Some States are contributing five or six times as much. The State of New Jersey spends twice as much annually for its experiment station as does Massachusetts. Massachusetts should provide its experiment station, in the not distant future, with an annual appropriation of not less than $100,000 a year for investigational work, including an adequate study of the agricultural resources, conditions and needs of the Commonwealth. Scores of important problems await study.

*Extension Service.* — Under the five years' appropriation for current purposes there was a "gentleman's agreement" that not to exceed $50,000 annually should be spent for the Extension Service of the college. This sum has proved entirely insufficient for growing demands. We have been obliged to postpone indefinitely a number of very important lines of work for lack of funds. A good illustration of this is in our failure to provide instructors for the non-English speaking farmers who are rapidly filling up various parts of Massachusetts. They are both farmers and potential citizens. They can be reached for the present only in their own language. We have cherished the hope for a half-dozen years that we could put at least one man into the field to help these people. The director of the Extension Service has annually called attention to new lines of work that are in demand but that we are unable to take up. I feel very strongly that we should have, in the not distant future, a total of at least $100,000 a year for extension work in Massachusetts, and of this at least $75,000 a year should be provided from the State treasury.

*General College Purposes.* — We need increased funds for the following purposes: —

1. As the college grows and as we add to its building equipment, the cost of maintenance of the physical plant will, of course, increase, and this, too, entirely apart from the probabilities of increased cost of labor, coal and other supplies. Just at present this last factor is one of considerable financial importance. We estimate that the Saturday half-holiday law for laborers alone has increased the labor expense by $5,000 a year.

2. It is generally admitted that the salaries of college teachers are inexcusably low. There is a movement all over the country to raise these salaries nearer to their proper amounts. Especially do we need larger salaries for teachers as contrasted with administrators. A recent investigation by the dean of one of our great agricultural colleges shows that while Massachusetts is doing reasonably well with its instructors and assistant professors, its professors and associate professors are among the lowest paid in the country, at least in the dozen or fifteen leading agricultural colleges. We have done our best, under our financial limitations, in regard to increase of salaries at this college, but, considering the cost of living, it is doubtful if the average professor has as large a real income as he had ten or fifteen years ago.

3. New instructors must be taken on as the number of students increases. In our college increase of students does not give increase of income, because we have no tuition.

4. A few new departments should be established, as, for instance, a department of horticultural manufactures and a department, or its equivalent, in history and government. We need additions to our work in rural social science, and particularly do we desire facilities for the instruction of women students, both in agriculture and in home economics.

5. Nearly all of our departments in agriculture and horticulture need more teachers, especially in advanced work. Many of these departments are undermanned.

It is possible that some saving can be made by cutting down the number of courses in modern languages and in mathematics, and it is even possible that we are offering too many courses in some of the science departments, but economies of this sort cannot be very pronounced and would not begin to meet such needs as have just been stated. A fairly constant increase of 5 per cent. per year for maintenance purposes should be regarded as an absolute minimum, and indeed it is all too little for the development of the work that is necessary to make the institution of the largest possible service to the Commonwealth.

## Methods of Finance.

For many years the financial needs of the institution were met by a small annual grant for maintenance of the institution and by special grants for permanent improvements. All through the history of the college it has been necessary to go to the Legislature for increases in maintenance funds and for new buildings. The Commission on Economy and Efficiency in 1913, under the leadership of Mr. Norman White, its chairman at that time, recommended very strongly indeed that the finances of the college be put on a permanent basis. His plan was carried out only in part. The result was a five years' appropriation for maintenance, with a progressive increase each year. This has proved very satisfactory except for the fact, already mentioned, that it has been encroached upon because for two years the Legislature failed to provide funds for improvements and equipment. Mr. White's original plan contemplated an appropriation large enough to include the erection of buildings. Two years ago and again last year bills embodying this idea were introduced into the Legislature. Both years the bill received the cordial support of the committee on agriculture. Last year the executive committee of the State Grange, the college committee of the Board of Agriculture, and a special committee of the alumni of the college visited the institution and gave some study to its needs for buildings and equipment. Each of these groups strongly favored a substantial six years' appropriation for permanent improvements. The present Commission on Investigation has before it the arguments for this plan.

### Some Principles of Finance for the College.

There are a few things that seem to be fundamental in a satisfactory financial policy for the college.

1. There should be a permanent financial policy. It is highly important that the institution may know its resources and plan accordingly. I am convinced from conferences with reputable contractors that a substantial saving, for example, could be made in building contracts if these contracts could be made in the winter instead of in midsummer, and the buildings erected during good weather rather than in the dead of winter.

2. Permanent appropriations should be progressive in amount, otherwise it is impossible for the institution to grow or even to maintain itself, as the number of students increases and the number of buildings to be maintained becomes larger.

3. The necessity of presenting the college case before the Legislature each year consumes a great deal of time that ought to go into the real work of the institution. Neither the president nor any other officer of the institution does any "lobbying." Nevertheless, the presentation of these matters before the proper committees, the preparation for these committee hearings, and even the very fact of uncertainty as to results are all factors in the consumption of time and energy. It is wholly wise that the institution should be required to give an account of its work to the Legislature, but it is highly uneconomical and unbusinesslike for the administrative officers of the institution to be compelled to use so large a proportion of their time as is now necessary in simply trying to secure necessary funds.

It is sometimes said that no Legislature should "commit future Legislatures" to expenditures for support of the college. This phrase sounds well but it does not mean much. The facts are that whenever a Legislature establishes a State institution it commits the Commonwealth for all time to come to a reasonable support of that institution. It is interesting to know that this very question with respect to the Massachusetts Agricultural College has been passed upon by the Supreme Judicial Court.[1] Referring to the acceptance by the Legislature of the provisions of the Federal Morrill Act of 1862, and of the grants thereby made to the State, the court said: —

> But the acceptance of the gift or grant for a public purpose of this nature, especially with the conditions attached to it by the act of Congress, involved the assumption by the State of certain duties and burdens which it was bound to perform and discharge. The gift was not an absolute one. It was upon certain trusts expressly set forth and declared, to the execution of which the State became solemnly pledged. No part of the funds derived from the sale of lands granted by the United States could be expended in the erection of buildings, and only a small portion thereof in the purchase of land. But expenditures of money to a large amount for these purposes were essential to the creation and establishment of the college which the Commonwealth was, by the act of Congress, bound to provide within five years from the date of the acceptance of the grant of land. This, therefore, was a public burden or duty which the Commonwealth had taken upon itself and was bound to discharge, in order that it might faithfully execute the trusts which it had assumed, and thereby enable the people of the State to enjoy the benefits which were expected to flow from the bounty of the national government.

In other words, the Commonwealth is forever "committed," indeed, "solemnly pledged," to support the college.

Furthermore, the Legislature is constantly "committing" future Legislatures in other ways. The present appropriation for highways is an example. Bond issues, in cases where the bonds are afterwards to be taken up and the debt paid, are examples of a little different type. Indeed, any bond issue commits the State irrevocably to the payment of interest on those bonds. It is further to be said that in the case of an appropriation bill for the support of the college that covers a period of years, it is perfectly competent for any Legislature to repeal that legislation. It seems to me that the argument for not committing future Legislatures has no adequate foundation, either in theory or in practice.

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[1] Merrick *v.* Inhabitants of Amherst, 12 Allen, 500.

### How can these Financial Principles be applied?

1. The present progressive maintenance appropriation might be continued for another five years; the resolve expires with the year 1918.

2. In addition, there might be made a five or six years' appropriation for improvements, say at the rate of $200,000 a year.

3. These two plans might be combined into one act, which would make, say, a five or six years' appropriation for all purposes.

4. The State might issue bonds for the erection of a certain number of buildings. California, for example, this last year voted a bond issue of something like two or three million dollars for its State university. This plan of bond issues might work especially well with dormitories. In my judgment dormitories could be made to pay interest on the bonds.

5. The money for the college might be raised on the basis of the so-called mill tax, which is not after all a tax but merely a method of determining the amount of income. Not less than fifteen States support wholly or in part their State educational institutions in this way. The valuation of the real and personal property subject to local taxation in Massachusetts is now approaching the amount of $5,000,000,000, and the amount of this valuation has increased in recent years somewhere in the neighborhood of $150,000,000 a year. An appropriation equal to twelve one-hundredths of a mill upon each dollar of assessed valuation would give the college nearly $600,000 a year for all purposes, and presumably an increase of something like $20,000 a year for an indefinite period. The mill tax is ideal provided it is large enough to begin with, and provided the basis of assessment remains fairly constant, so that there will never be either big decreases or big increases.

I do not care to argue here at length for any one of these plans; they are stated in the briefest way, merely to afford a basis for discussion of details.

## In Conclusion.

In thus discussing the general question of financial support for the college I have been obliged to cover ground which has been gone over in former reports. May I say also that after all these years of service on the part of the college it would almost seem unnecessary to take so much time to discuss or to lay so much emphasis upon the mere question of adequate and permanent support. Surely the Commonwealth after fifty years should have made up its mind on this point. Unfortunately, however, as I intimated at the beginning of this discussion, this very question is the most important that we have before us. The most cursory examination of our needs must convince any one that we face a critical situation. It is due the college and its staff that some decision as to permanent support be reached at once.

Respectfully submitted,

KENYON L. BUTTERFIELD,
*President.*

## THE REVIEW OF THE YEAR.

### CHANGES IN TRUSTEES.

At the close of his administration Governor Walsh appointed Mr. James F. Bacon of Boston to succeed Mr. Arthur G. Pollard of Lowell as trustee of the college. Since the retirement of the late M. F. Dickinson the Board has felt the need of a legal adviser among its members. The selection of Mr. Bacon has proved to be a fortunate one.

Soon after the death of Mr. William H. Bowker, Governor McCall appointed Mr. Arthur G. Pollard of Lowell to fill the vacancy; thus the Board will continue to benefit by the experience gained by Mr. Pollard through his years of service on the Board.

During the year, owing to the resignation of Dr. David Snedden, Commissioner of Education of Massachusetts, Dr. Payson Smith, by virtue of his succession to Dr. Snedden, becomes a member of our Board of Trustees. We are glad to welcome him to our number.

### CHANGES IN STAFF.

Dr. George E. Stone retired from active service Sept. 30, 1916. Dr. Stone was connected with the college and experiment station from 1895, having been head of the department of botany and in charge of the research work in this subject. Dr. Stone was possessed of marked natural talent and ability as an observer and investigator, and his scientific work has been characterized by originality, ingenuity and enthusiasm. He has been one of the most fruitful workers of the institution, and possessed unusual ability to arouse the interest and enlist the co-operation of advanced students, whose work along selected lines and under his guidance was made contributory to the working out of broader problems which had engaged his attention.

At the end of June, Prof. Sidney B. Haskell left the institution to take up work as soil expert with the soil improvement committee of the National Fertilizer Association. It was with deep regret that we felt obliged to accept his resignation.

Since Professor Haskell's graduation from this college in 1904 he has been connected with the institution, first as assistant in the experiment station, later as instructor in agronomy, and for five years head of the department of agronomy. Although teaching a subject in which he was obliged to establish his own standard for perfection, and in which but a limited amount of material had been assembled by others, he made a distinct reputation for himself as a teacher and organizer through his high ideals of scholarship and genuine teaching ability. He elevated the work of his department to a plane second to none in any department of the institution. We have not yet succeeded in discovering a man who we are satisfied will continue the work in agronomy on the same high plane of efficiency as that established by Professor Haskell.

During the summer Prof. Orion A. Morton accepted a position as agent for the Massachusetts Board of Education. Professor Morton came to this institution four years ago to organize the boys' and girls' agricultural clubs throughout the State. In this work he was eminently successful, so that there are boys' and girls' agricultural clubs in 315 cities and towns of Massachusetts. These clubs comprise a membership of about 50,000, probably the largest enrollment of any State in the Union. This achievement is really a stupendous one numerically and a momentous one educationally. We regret that Professor Morton found a more attractive call elsewhere.

Mr. George L. Farley succeeds Prof. O. A. Morton as supervisor of junior extension work. Mr. Farley is a graduate of Dartmouth College, from which institution he also has the degree of master of science. He has had eighteen years' experience as a teacher of grammar schools and as school supervisor, in these capacities serving in the following towns and cities: Hanover, N. H., Hyde Park, Mass., Cambridge, Mass., Brookline, Mass., New Haven, Conn., and Brockton, Mass. It was under Mr. Farley's administration as superintendent of the Brockton schools that the boys' and girls' club work in that city developed so successfully. Coming as he does with a wide experience and acquaintance with school work, and with ability as an organizer and administrator, the continued success of this extremely important phase of our work seems to be assured.

Mr. Earnest D. Waid has resigned his position as assistant director of the Extension Service. Mr. Waid has been connected with our Extension Service since September, 1911, coming to us with several years of successful experience in similar work and in teaching at other agricultural colleges and universities. While here, Mr. Waid's special work has been that of organizing and supervising the extension schools, fair exhibits, lectures and lecture courses, and the winter ten weeks' course. Mr. Waid has been a faithful, industrious and efficient member of the Extension Service staff, and it is with regret that his resignation has been accepted. Mr. Waid will sever his connection with the institution in the early spring, and devote his full time to the development of his farm in Amherst.

Mr. E. F. Damon was in the winter of 1916 secured to fill the vacancy caused by the death of Prof. R. H. Ferguson, in extension work in agricultural economics. Mr. Damon graduated from the Massachusetts Agricultural College in 1910. Following a year's graduate work in agricultural economics at the University of Wisconsin, he spent nearly five years in the west in various agricultural co-operative enterprises. Just prior to taking up his work at Amherst he was manager of one of the largest fruit growers' exchanges in southern California.

Charles H. Patterson succeeds Henry E. Smith as assistant professor of English. Professor Smith has rendered for four years most acceptable service; cultured, highly trained, exceedingly industrious, he gave us his best. Professor Patterson is a graduate of Tufts College, and has studied at Chicago University. He has had a long and successful experience in high school teaching and in administrative work. The principal schools with which he has been connected are the Boston School of Expression, the West Virginia University, and Dean Academy as principal.

John T. Wheeler has been elected assistant professor of horticulture. With the introduction of a larger amount of agriculture and horticulture to the curriculum required of freshmen and sophomores it became necessary to provide additional instruction in horticulture as well as in agriculture. Professor Wheeler is a graduate of the University of Wisconsin, also of the State Normal School at Mansfield, Pa. He has had several years' experience as high school principal and as supervisor of schools. At this institution he will assume large responsibility in connection with the direction of the freshman agriculture and horticulture.

### Reorganization of the Department of Botany.

The department of botany has been reorganized during the year, with Prof. A. Vincent Osmun as head of the department. Professor Osmun graduated from this institution in 1903 and received his master's degree here in 1905. Since the latter date he has been continuously connected with the institution as an investigator and teacher.

### Attendance.

The enrollment in the present freshman class is 170; a year ago the number was 211. The total enrollment, however, of all students in work of college grade is 680, as compared with 668 a year ago, the increase being about 1.8 per cent. The reason for the substantial falling-off in the size of the entering class has not been satisfactorily established; doubtless a number of causes contributed to this result. One cause, which apparently has considerable foundation, is, that some students, who were planning to enter this year, decided to wait until another fall because of the fact that this year they were able to obtain work at high wages, thus making it easier for them to finance their college course at a later date. The total number of young women students is constantly increasing; 6 entered in this year's freshman class, making a total enrollment of 28. (See Table V. for analysis of enrollment.)

### Commencement.

The annual Commencement Day exercises were held Wednesday, June 21. The degree of bachelor of science was conferred on 100 men and 2 women; 5 candidates received the degree of master of science and 3 the degree of doctor of philosophy. The alumni dinner was attended by 223 alumni and officers of the college. President Kenyon L. Butterfield delivered the Commencement address, his subject being "The New Rural Advance." In this address he reviewed briefly the significant achievements in agricultural education during the past ten years, and ventured certain predictions as to future development.

## Fiftieth Anniversary.

Plans are maturing for the fiftieth anniversary of the opening of the college. The dates decided upon are October 7 to 10 inclusive. The following program has been voted by the executive committee in charge of the celebration and by the trustees. Work is progressing on the brief history of the college and on the bibliography. Mr. William C. Langdon has been chosen as the pageant master, and is now on the grounds developing his plans for the pageant.

### *Provisional Program, 1917 Celebration.*

Sunday, October 7:
- 3.00 P.M. Outdoor Commemorative Program, Pageant Grounds.

Monday, October 8:
- 10.00 A.M. Dedication of the Athletic Field.
- 2.30 P.M. Foot Ball Game.
- 5.00 P.M. Alumni Dinner and Program.
- 8.00 P.M. Undergraduate Night.

Tuesday, October 9:
- 10.00 A.M. Addresses by Delegates.
- 12.00 M. Class Reunions.
- 1.00 P.M. Luncheon to Delegates.
- 3.00 P.M. Pageant.
- 8.00 P.M. Formal Reception by the Governor, the Trustees and President.
  Fraternity Reunions.

Wednesday, October 10:
- 10.00 A.M. Meeting of Association of American Agricultural Colleges and Experiment Stations.
- 12.30 P.M. Outdoor Dinner.
- 2.00 P.M. Anniversary Speaker.
- 3.30 P.M. Pageant.

## THE FOUR-TERM PLAN.

Last September the college opened on the plan, formerly developed and duly approved, of dividing the year into four terms, including a summer session. While as yet the plans for the summer course are not entirely matured, it is probable that beginning next year a start will be made in giving summer instruction.

## THE GRADUATE SUMMER SCHOOL, 1916.

On invitation from your Board, the graduate summer school of agriculture, conducted biennially by the Association of American Agricultural Colleges and Experiment Stations, was in 1916 held at the Massachusetts Agricultural College from July 3 to 28 inclusive. Dr. Charles E. Marshall was chosen to assist Dean A. C. True in the conduct of the school, and there was developed a most helpful program. The attendance was somewhat of a disappointment, but the character of the work given was of the best, and it was felt that it was entirely worth while for this institution to entertain the school. The total enrollment was 194, composed as follows: from the Massachusetts Agricultural College, 87; from other New England States, 41; from other States, 58; and from foreign countries, 8.

## SCHOLARSHIP AND CHARACTER RECORDS.

This year we have organized a small group of instructors who are serving in conjunction with the dean of the college as class advisers; one or two instructors are assigned to each class, and their function is to keep in constant touch with the scholastic standing of each student under their direction. By frequent conferences on scholarship matters or other problems of the student, it is possible to help the men in realizing to a fuller extent their opportunities here. With the younger men it is possible to enlist the co-operation of parents, wherever necessary, in maintaining a satisfactory scholastic grade in all subjects. The work thus accomplished seems to be entirely worth while, and already gratifying results have been observed.

The dean has during the year organized a plan for making rather systematic personality studies and keeping character records based upon opinions and statements made by the teachers.

### COMMITTEE ON STUDENT EMPLOYMENT.

During the year there has been formulated by the faculty committee on employment a rather comprehensive plan for the appointment to permanent positions at the college of students who need to earn a portion of their college expenses. Student labor has been classified into three groups: skilled labor positions, permanent positions and irregular unskilled positions. Applications for these various positions are made either to heads of departments or to the committee, the heads of departments making the appointment, the committee passing on the need of the student for work, his ability, his classroom work, his character, etc. In this way the student labor at the college is being very thoroughly systematized.

### COMMITTEE ON PUBLICATIONS.

Growing out of discussions in the cabinet there has been organized during the year a committee on publications. The committee consists of the director of the experiment station, the director of the Extension Service, the director of the graduate school, the supervisor of correspondence courses, — who also has charge of the editing of Extension Service publications, — and the secretary of the college. The committee has undertaken to supervise the official publications of the college for the purpose of securing proper editing, institutional opinion in technical matters, avoiding duplication, and meeting public demand for various bulletins of a technical nature. Thus far the plan has worked successfully, and has accomplished some very useful and needed work.

### CO-OPERATION WITH THE BOARD OF AGRICULTURE.

The State Board of Agriculture accepted the invitation extended by your Board to go into conference on the subject of co-operation between the two agencies. As you know, the negotiations are not at this date completed, but they have gone far enough to indicate that it will be possible to agree upon the principle that the main function of the Board of Agriculture is administration and the main function of the college is education; and, further, that overlapping of work may be eliminated through the appointment of a joint committee of co-operation and through agreement upon written projects for new lines of work taken up by the one agency, that are likely to duplicate in any way the work of the other. This co-operation is most gratifying, and is in line with the best agricultural thought of the day.

### THE MASSACHUSETTS AGRICULTURAL DEVELOPMENT COMMITTEE.

During the year the president has attended practically all of the monthly meetings of this committee. Both Dr. Cance and Professor Morgan have given much time and valuable service as special agents of the committee. Its work has demonstrated its usefulness. Two important and solid achievements have been gained during the year, one an agreement upon an outline of a comprehensive study of the agricultural resources, conditions and needs of the Commonwealth, — a study that will take years to complete but which may and should be begun at once. The proper division of labor in regard to carrying out this enterprise was also agreed to. The other achievement is the outlining and stating of the whole problem of agricultural development in the Commonwealth. There is still much work before this committee. Perhaps the most important single problem before Massachusetts agriculture to-day is that of thoroughgoing and comprehensive organization.

### ADDITIONS AND IMPROVEMENTS TO PROPERTY.

The Legislature of 1916 granted an appropriation of $12,000 for three additional rooms to the present wing of the rural engineering building. This addition is almost completed and is being used by the department in the much-needed shop work.

The coal pocket, for which the Legislature also granted an appropriation, was completed in the early part of October. We now have fairly adequate storage for our coal.

The usual repairs and improvements necessary to keep the buildings in good condition have been carried on during the summer.

The Legislature also granted the institution the right to purchase land, with the consent of the Governor and Council, up to the value of $20,000. It is understood, however, that not to exceed $5,000 a year shall be expended in each of the four years which the appropriation covers. We have purchased from John F. Dickinson the Leonard-Dickinson land, which lies to the south of the athletic field and gives the necessary space for added recreational facilities. The institution also secured a small tract of one-half acre of land from Mr. W. R. Brown, situated on East Pleasant Street, and the only parcel of land needed to make our line complete along that road.

The institution is greatly indebted to the heirs of the John L. Graves estate, to Mr. John F. Dickinson and to Mr. W. R. Brown for the interest they have taken in helping the college secure the different parcels of land in which they were interested.

The most notable addition is the building for the department of microbiology. The contract for this was let in the summer of 1915, but the building could not be occupied until October of this year. The delay was due almost entirely to the difficulty of securing the necessary material and labor. A brief description of the building follows.

## THE MICROBIOLOGICAL LABORATORY.

This building is unique in that its design is the result of the peculiar needs for the successful study of micro-organisms. It is fireproof throughout, with the exception of the roof boards and the hard maple floors, which are laid over the reinforced cement separating the different stories. The partition walls are brick and the ceilings are the facings of the reinforced cement floors finished and painted. There is no plaster on walls or ceilings anywhere in the building. The building is thus admirably adapted for the maintenance of cleanliness.

There are four laboratory class rooms. The one on the second floor is large and is designed for the general classes in microbiology; the one on the first floor will be used for dairy and food microbiology; and the basement has two, one for soil microbiology and one for hygienic microbiology. For recitation purposes there is a small class room located on the first floor. In addition to the above class laboratories, there are eight individual laboratories or research rooms, and a large library room on the first floor for consulting literature, reading and study. There is an office on each floor for instructors. The general office and clerical office are located near the entrance door on the first floor. There are five temperature rooms and a sub-basement or cellar room for the control of temperatures. There are three hood rooms, three sterilizing rooms and three wash rooms, one on each floor. The hood rooms, sterilizing rooms and temperature rooms are constructed about a shaft running from sub-basement to roof, which serves for purposes of special ventilation by means of small flues within the shaft, and also contributes to the safety of the building should an explosion occur. On each floor are also found a balance room and an inoculating room. In the basement, besides the other rooms mentioned, are a photographic room, an animal room, a furnace room, and a room in which the power apparatus is concentrated. Electricity, gas, hot and cold water, vacuum and pressure systems are distributed as needed throughout the building.

The building as a whole, therefore, is splendidly adapted to the teaching of and research in agricultural microbiology, and is probably one of the best arranged and equipped structures of its kind in the country.

## Rural Engineering Shops.

The rural engineering building is a one-story structure 126 feet long and 68 feet deep, built with brick walls and concrete floors. The single story construction admits of the use of skylights, which make the building well adapted to shop purposes. The building has three large laboratories, used for carpentry, farm machinery and general farm repairs. A lumber storage room is adjacent to the carpenter shop and a tool room is centrally located to the three laboratories. There are two offices and a locker room in the building. The portion of the building now completed forms two-thirds of the shop building planned for rural engineering.

## THE MOUNT TOBY DEMONSTRATION FOREST.

This tract consists of approximately 755 acres of timbered land, of which 721 acres are in the town of Sunderland and about 34 acres in Leverett. For a mile and a quarter it lies along the Central Vermont Railroad and includes the site of the old Mount Toby station, which is about 9 miles north of Amherst station. The forest composition is unique in that it is so representative of state-wide conditions. Every important forest type and combination of types found from the Berkshire Hills to the Cape are represented, and, what is even more rare, most of these types are found in every stage of development, from early youth to mature old age.

This is to be, as the name implies, a demonstration forest, and it will be the aim of the management to show by concrete example what scientific forest management, when actually applied to our Massachusetts woodlands, will accomplish. Just as the Massachusetts Agricultural College has been instrumental in bringing about improved farm management and production through experimentation and demonstration along those lines, so we hope by similar means to be instrumental in bringing about an improved forest management and production.

## THE MARKET-GARDEN FIELD STATION.

The effort made in the last Legislature by the Boston Market Gardeners' Association to secure appropriations for the purchase of land, the construction of buildings and equipment for experimental work in the interests of market gardening, and for its annual support, was only in part successful. The bill submitted by the association called for $25,000 for the purchase of land and the construction of buildings and equipment and $10,000 annually for maintenance. The Legislature granted only $8,000, which was to be used in the purchase of land. After a very thorough search on the part of the trustees, with the aid and counsel of interested members of the faculty and of the officers of the Boston Market Gardeners' Association, the Board finally chose an area of about 12 acres in North Lexington, and the purchase is about to be consummated. Great credit is due to Prof. H. F. Tompson for his energy and skill in helping to bring this matter to a successful conclusion. A bill calling for an appropriation for buildings and maintenance will go before the Legislature at this next session. It will also be necessary for your Board of Trustees to adopt a definite plan of administration for this field station.

## PUBLICITY.

During the year we have been able to organize somewhat more effectively than formerly the publicity work of the institution. For several years we have desired to effect this organization because there is a growing demand on the part of the public for further information concerning the work of the college. Mr. Charles H. Gould, a graduate of the college in 1916, has been appointed field agent of the college, working under the direction of the secretary. He is devoting his time to lectures before high schools, granges and other bodies, organizing excursions to the college, publishing pamphlets, etc.

## LEGISLATIVE APPROPRIATIONS.

Bills were presented to the Legislature of 1916 covering the following projects: (*a*) completion of power plant, $35,000; (*b*) library, $230,000; (*c*) extension of rural engineering shops, $12,000; (*d*) student dormitory, $40,000; (*e*) miscellaneous improvements and new equipment, $60,000; (*f*) extra labor on account of Saturday half-holiday, $5,000; our request for $30,000 for the purchase of the Mount Toby tract was also renewed. An attempt was made to secure a continuing appropriation for $200,000 a year for six years for buildings and other improvements.

We were gratified with the action of the Legislature in appropriating $30,000 for the purchase of the Mount Toby tract. The only other appropriations granted, however, were $20,000 for equipment and improvements, $4,200 for a retaining wall at the power plant, and $12,000 for the extension of the rural engineering shops. The Legislature declined to grant the appropriation for the library and dormitory, and also to make the six-year appropriation.

## THE INVESTIGATION COMMISSION.

The Legislature of 1916 authorized a commission to investigate the work of the college and other agricultural State agencies. The complete text of the law creating this commission and the scope of its work follows: —

### RESOLVE PROVIDING FOR AN INVESTIGATION BY A SPECIAL COMMISSION OF AGRICULTURAL EDUCATION AT THE MASSACHUSETTS AGRICULTURAL COLLEGE AND THE DEVELOPMENT OF THE AGRICULTURAL RESOURCES OF THE COMMONWEALTH.

*Resolved*, That a special commission is hereby established, to be composed of the commission on economy and efficiency, the commissioner of education, and three persons to be appointed by the governor, with the advice and consent of the council, for the purpose of investigating the subject of agricultural education as conducted at the Massachusetts agricultural college and the development of the agricultural resources of the commonwealth.

The commission shall investigate and report as to the advisability of further expenditures for new buildings, additional equipment, the purchase of land and other improvements at the Massachusetts agricultural college; as to the present policy of the college, with a view to ascertaining whether the college is meeting in the fullest degree the needs of the commonwealth as to agricultural training; as to use of state and federal appropriations and grants; as to operation of farm department, in educational and academic instruction, and in the extension work; to find to what extent teachers are engaged in activities other than college instruction; to what extent students are taught practical farming; to what extent the college, independent of other agencies, contributes toward farming and agricultural development; to what extent the present acreage and present accommodations may be economically treated and utilized; to find the relative cost per capita for the education of state and out-of-state students in the various courses of instruction with comparisons with other agricultural institutions; to distinguish educational apart from other activities; to estimate cost of future development, if any, both for initial appropriation and for maintenance; elimination of other activities, revision of courses of study either in character, weeks of schooling, etc.; to ascertain what return, if any, is made to the commonwealth by graduate state educated students in the agricultural activities of the people of the commonwealth; to ascertain what benefits, if any, can accrue to the welfare or development of agriculture in the commonwealth by co-ordination of the Massachusetts agricultural college, the state board of agriculture, forestry department and department of animal husbandry, or any of them; to the end that the report shall make a definite statement of existing conditions, specific recommendations for correction or improvement of existing conditions, that certain obvious existing duplications and overlappings of activities be eliminated and the departments herein referred to may be better co-ordinated and systematized into an effective administrative section of the commonwealth's efforts in behalf of its citizens.

The commission shall report what existing functions of agriculture, expenses for which are met by state appropriations, can best be carried on at the college rather than under the direction of the board of agriculture, and what functions now carried on at the college can better be performed under the direction of the board of agriculture.

The commission shall further report whether for the advancement of agriculture in Massachusetts it is advisable that the college be continued as at present organized.

The commission shall give public hearings, and shall be allowed for necessary expenses such sums as may be approved by the governor and council, not exceeding seventy-five hundred dollars. The commission shall report in print on or before January tenth, nineteen hundred and seventeen, and shall include in its report drafts of any bills necessary to carry out its recommendations.

Pursuant to the requirements of this law Governor McCall appointed the following as members of the commission: Dr. L. Clark Seelye of Northampton, Mr. Warren C. Jewett of Worcester and Mr. William L. Whiting of Holyoke; the two ex-officio members were Dr. Payson Smith, Commissioner of Education, and Mr. Charles E. Burbank, Supervisor of Administration. This commission organized with Dr. Seelye as chairman and Dr. Smith as secretary, and began its work in September. It has held a series of hearings, and the chairman has spent a large amount of time at the college. The college is indeed fortunate to have such an able body of men delegated to investigate its work. We have welcomed the investigation, and endeavored at every point to co-operate to the fullest extent with the commission.

## THE IMMEDIATE NEEDS OF THE COLLEGE.

### LEGISLATIVE BUDGET, 1917.

The following legislative budget for 1917 has been approved by the Board of Trustees: —

| | |
|---|---|
| Library, | $250,000 |
| Equipment and improvements, | 75,000 |
| Poultry building, | 4,200 |
| Student dormitory, | 50,000 |
| Dining hall improvements, | 10,000 |
| Rural engineering shops, | 9,000 |
| Power plant, turbine house and steam line tunnels, | 90,000 |
| Total, | $488,200 |

Following is a brief statement of the need for the appropriations as requested: —

### *Library, $250,000.*

In my report last year I dwelt at some length on the very pressing need for adequate library facilities. I can do nothing more this year than to reiterate those arguments, and to state that the need is even more apparent to-day than a year ago. The consensus of opinion among the college staff is that a new library represents the most pressing building need of the institution.

### *Equipment and Improvements, $75,000.*

For three successive years the Legislature has made inadequate provision for much-needed improvements and new equipment at the college. The requests for this year, therefore, represent accumulated needs. A list of some seventy projects for improvements and of one hundred and fifteen projects for equipment have been submitted by members of the staff, and it is apparent that nearly all of these represent needs which should be met immediately. They cover various improvements on the campus, such, for example, as the construction of suitable walks and roads, and minor changes in buildings, in order to bring the present facilities up to the growing demands made upon them. It is necessary each year to purchase additional equipment and to replace old equipment.

### *Poultry Building, $4,200.*

The equipment for the poultry department is still far from complete, due in part to the fact that this work was undertaken in a large way only six years ago. A much-needed addition, which is being requested at this time, is a poultry breed and judging laboratory, 20 by 104 feet. The building here contemplated will provide a poultry house containing twenty-four small pens and laboratory space for general demonstrations; also a large room on the second floor adequate for the accommodation of twenty-five to fifty students in work in judging poultry.

### *Student Dormitory, $50,000.*

This is the seventh successive year in which the college has asked the Legislature to provide funds for a small dormitory. Arguments for this building have been so fully and frequently presented that I will not restate them in this connection. I still feel, however, as evidently the Board of Trustees feels, as well as the students and faculty, that this is an extremely imperative need. At a time when student expenses are increasing materially, due to the high cost of living, it would be extremely desirable, from the standpoint of the college, to check the increasing living expenses in some small degree by affording comfortable living accommodations on the campus for a larger percentage of its students. The plan as presented will provide a dormitory to house fifty students, and estimates indicate that the building will pay a fair percentage on the investment represented, as well as provide rooms at a relatively low cost.

### *Dining Hall Improvements, $10,000.*

When the dining hall was remodeled a few years ago, funds were not available for the construction of suitable storage facilities in the basement. The need for these has become more distressing each year, but no relief has been granted by the Legislature. The project as now outlined contemplates the construction of a separate storage for potatoes, storage for one hundred tons of coal, and a complete refrigerating plant for meat, butter, eggs, fruit, etc.

### *Rural Engineering Shops, $9,000.*

The Legislature of 1916 appropriated $12,000 for the construction of a one-story factory type of building for laboratory work and instruction in rural engineering. Whereas this provides the initial equipment for work in rural engineering, the building is not yet adequate. Accordingly, a request has been presented for the completion of these shops, and the expenditure here contemplated is for a unit 32 by 126 feet, providing a forge shop and an additional room for field machinery. By the addition of this unit we would be able to offer a complete course of instruction in the repair of farm equipment, including forge work. It will also enable us to bring together into one laboratory all the farm machinery used for instruction purposes. The work in rural engineering is appreciated by the students, and the large number who elect the courses are making unusual demands upon the department, particularly with respect to laboratory facilities.

### *Power Plant, Turbine House and Steam Line Tunnels, $90,000.*

Owing to the buildings which have been erected at the college since the power plant was built, some eighteen years ago, the requirements made upon the plant have been increased many fold; thus, conditions at the plant are in need of prompt attention if efficiency in heating and lighting is to be rendered. In the boiler room there is at present no emergency equipment. We should have at least one spare boiler to meet possible emergencies. If new buildings are added, we should have the following additional equipment: —

One 400 horse-power water-tube boiler.
One stoker.
One superheater.
Coal-handling apparatus.
Ash ejector.
Additional flue.
Feed pump.
$CO_2$ machine.
Draft gauge.
Flue gas pyrometer.
Return tank.

Minor changes in the construction of the present plant will be involved in the installation of this apparatus. The total cost of this equipment will be approximately $36,000.

It has been found that the institution can generate its own electricity at a cost which represents a material saving over the price which would be paid if purchased outside of the college. The present room used for the turbine is much too small. With the additional demands made upon the lighting system, due to new buildings, another dynamo is necessary, and it is proposed to install this in a separate turbine house, to be constructed north of the present power plant. The cost of the turbine house, dynamo, switchboard and crane, together with the cost of installing these, would be approximately $29,500.

It has been necessary to make some rather extensive improvements in certain sections of the present underground steam line, and in view of the fact that several large buildings are needed in the near future, the engineer deems it advisable to undertake these repairs and alterations, looking somewhat into the future. We are asking, therefore, for an appropriation of about $24,000 for initial improvements.

### Market-garden Field Station.

For properly improving the land purchased for the market-garden field station, in accordance with the act of the Legislature, 1916, and for providing suitable equipment for the prosecution of experimental work in market gardening, an appropriation of $25,000 is requested. A sum of $10,000 is requested for labor and other maintenance costs for a two-year period ending Dec. 1, 1918.

# REPORTS OF OTHER ADMINISTRATIVE OFFICERS.

## IN THE DEPARTMENTS OF INSTRUCTION.

### The Dean.

On account of a very large freshman class of 1915, the work of the dean's office accumulated considerably as the year came to a close. Our work has much to do with the freshmen, especially in respect to helping them pull through at the end of the academic year. The transition from the two-semester basis to the three-term basis also added a great deal to our office work, such as planning new record cards, forms, etc. Altogether it was a comparatively busy year.

During the year we introduced a "work and character record" of the students, and expect that it will prove helpful and effective as a permanent record, and fairly accurate. We asked each instructor to indicate on a record blank the intellectual, vocational and moral qualities revealed by each student in his class. We shall have an impression of the students recorded by each instructor each term on this blank. In this way we shall have at the end of four years a composite impression that may be a real aid to prospective employers, and to others who may make inquiries. It will also help us to tell the boy better than we now can what kind of work he might best take up.

With the beginning of this term we inaugurated a scheme of class advisers, — three over the freshman class, two over the sophomore class, and one each over the two upper classes. The duties of the advisers are to serve as an intermediary between the faculty and the class, to consider with the class sympathetically any questions such as the class wishes to have faculty advice upon, and to confer personally with individuals who are down in scholarship or who fail to have the proper attitude toward their work. The freshman advisers have been especially active during the term, and I think quite helpful. It is, however, too early to make a definite statement as to the results.

Our great need is for time and help to total, classify and interpret the records that we are accumulating. We cannot do this now with the present force. The increased correspondence and the three-term system have added so much to our duties that our half-time clerk cannot do any more than to carry the extra burden.

EDWARD M. LEWIS,
*Dean.*

### The Division of Agriculture.

The work of the division has continued along lines previously determined upon and approved. The increased equipment afforded has given much needed facilities for work, and has been thoroughly appreciated by the staff and also by the student body, as shown by increased interest and registration. Among these facilities the Division Library in Stockbridge Hall, under the efficient care of the library assistant assigned to it, deserves mention.

Beginning in September, 1916, the Departments of Agronomy, Animal Husbandry and Poultry Husbandry have co-operated with the Department of Pomology in offering a required laboratory course in agriculture for freshmen.

The completion of the second unit of the rural engineering shop has enabled the department to offer courses in building construction and the repair of farm equipment. The completion of the third unit and the addition of an instructor in forge work are strongly recommended.

On the farm a small appropriation is needed for modern tools and machinery; as stated in a preceding report, a college farm should lead and not follow in the matter of its equipment. The Department of Animal Husbandry has submitted plans for a small calf barn. This building, in addition to its value as a demonstration, would add to both the ease of caring for and the profit from the college herd.

Among the important needs are: (1) Sufficient money for salaries, so that our best men may not be drawn away by other institutions. (2) A closer relation between those engaged in teaching and extension work and those engaged in research work. This has been accomplished in one of the departments of the division, and the results justify the hope that the other departments may soon be similarly organized. Agriculture is a living, growing science, and efficient teaching demands close relations with research, probably not in the same person, but in the same department. (3) A more liberal administration of our entrance requirements. There is a grave question whether all students studying for an agricultural vocation, even if they are to become leaders in the rural communities, can afford the time now spent upon the study of French and German, or possibly even some of the higher mathematics. Not lower entrance requirements, but a broader view is needed if the agricultural vocations are to receive their greatest help from the college.

J. A. Foord,
*Head of the Division.*

### The Division of Horticulture.

An important change in the activities of the division for this year comes with the establishment of a freshman course under the charge of Prof. John T. Wheeler. Another progressive step has been the wider development and intensification of the extension work in landscape gardening. Mr. F. A. C. Smith, who came to us about Feb. 1, 1916, has proved to be very energetic and efficient in this work. A large demand for this service has developed and some very interesting projects are under way in different parts of the State.

Probably the most important development in the division this year has been the acquisition of the Mount Toby demonstration forest tract. Of a somewhat similar nature is the acquisition of a tract of land in North Lexington, to be used as an out-station of the Department of Market Gardening.

We greatly need to develop a Department of Horticultural Manufactures. This enterprise requires a small laboratory building and at least one good teacher. This project has been pending now for some years and grows constantly more desirable. With the acquisition of the out-station for the Department of Market Gardening it seems desirable to strengthen the organization of this department and to push with considerable vigor the work along these lines. For this purpose, and in the interests of other branches in the division and the college, it is very desirable that a first-class teacher be employed to develop courses in plant breeding.

The Division of Horticulture is beginning to be seriously crowded for room. After much discussion it appears that the easiest and best relief would come through moving the Department of Landscape Gardening out of Wilder Hall. Various projects have been considered looking toward this end, especially the remodeling of the old Stockbridge house. At present it seems that the end could best be accomplished by the erection of a small building in the horticultural service group on the hill, this building to be of such a character that it could be converted to other uses sometime in the future. While such an enterprise would be comparatively inexpensive, it would give substantial relief to various branches in the Division of Horticulture, especially to the Departments of Pomology and Landscape Gardening.

F. A. Waugh,
*Head of the Division.*

## The Division of Science.

In the Division of Science the year has found little in the way of changes. A few new courses have been offered, and with the division of the year into three terms, many adjustments have, of course, been necessary.

The increased number of students during the last few years has produced difficulties in the way of accommodation and equipment in some cases. The most recently established departments have been able from the start to anticipate something of the demand and provide more or less completely for it. Some of those longer in existence are housed in buildings probably amply large for the time when they were erected, but inadequate now, and their equipment also needs increasing to meet the needs of larger classes.

The general feeling of those connected with the division seems to have been that while many improvements are desired to strengthen the various departments, much can also be done with the opportunities available, and that the thing to do is to accomplish as much as possible under present facilities.

In the Department of Botany important changes in the organization have been made. The teaching has been reorganized, and a complete revision has been made of the course of study offered in this department. The year's work is starting on a new basis. The department has endeavored to secure better balance and closer co-ordination of the courses within the department and with the work of other departments. There are still some readjustments desirable. Perhaps one of the most important changes is that which gives students opportunity to pursue a full year's work in botany prior to the junior year, thus providing a much better basis for the elective courses which follow. A new elective course in systematic mycology, extending through three terms, will give a much better preparation for courses in phytopathology which follow. Division of the work of the junior course dealing with diseases of crops, giving opportunity for men majoring in technical lines to confine their study to the diseases of the particular crops which interest them, has increased the popularity and usefulness of this course. The course in plant physiology has been thoroughly revised and is proving a very valuable course, not only for the major students but for those specializing in such technical lines as greenhouse management and agronomy. Important changes in the conduct of graduate work have also been made. There is urgent need of some new equipment, especially modern microscopes to replace a considerable number of very old ones. There is also most urgent need of better accommodations for courses in plant physiology.

The Department of Chemistry has established a chemical seminar which meets once in two weeks, at which graduate students discuss their own work or review important lines of work published in the different chemical journals. The professors of the department also discuss special chemical topics, and take part in friendly criticism of the work brought forward by the graduate students. A larger number of students than usual are electing the various chemical courses. Thus in 1915, 50 students elected qualitative analysis, and in 1916, 70 students are electing the course; in 1915, 33 elected organic chemistry, and in 1916, 37; in 1915, 18 elected junior qualitative analysis, and in 1916, 25. It appears also that there is more of a tendency than formerly for other departments to recommend students majoring with them to take chemistry as a minor. There remains the same pressing need, — a new laboratory. The department finds itself severely handicapped because of lack of small laboratories for graduate students. In connection with the new laboratory, a small glass house will be needed to conduct experiments in plant nutrition; also one or more lysimeters, for studying the action of different elements of fertility on different types of soil.

In the Department of Zoölogy a new elective course has been introduced in the sophomore year and a new required course in agricultural geology in the freshman year. The department has adjusted itself as well as possible to the four-term plan, and the work has gone forward much as in former years.

In the Department of Mathematics the most pressing need at this time is that some better provision be made for the care of the clerical work of the department.

The Department of Microbiology rejoices in having a home at last. When equipped in full, the department will be in excellent condition to meet the teaching requirements likely to be placed upon it.

The Department of Veterinary Science reports no new developments of special importance.

H. T. Fernald,
*Chairman of the Division.*

### The Division of the Humanities.

The change to the three-term plan is likely to have some influence upon the courses elected in this division, although no good judgment can be formed of this influence until the plan has been in operation for at least two or three years. However, it is to be observed that this autumn there has been quite a notable reduction in the electives in certain courses, as in French; although in one case there has been a marked increase in the number of students taking German. It is probable that the larger elections in the Division of Rural Social Science may reduce the elections in this division.

I have emphasized in former reports the need of supporting public speaking in the college and will not renew the matter now, except to say that we need a strong work of this kind, and every possible encouragement should be given to the man who tries to build up that branch of the humanities.

We have a number of problems. Perhaps the most serious is the instability of the location on the campus. There are many difficulties in conducting classes to advantage in buildings used by other departments for different purposes. We ought to have permanent headquarters for the division, with proper offices and classrooms, bringing together as much of the humanities' work as possible under one roof, where mutual interest may be developed and an atmosphere built up, which will, with continuous concentration, increase of equipment and the study of method, get all courses adapted to the needs and character of the student body and the goal of the college, and greatly advance the work of this division.

Another problem is, to what extent can our subjects be turned towards the agricultural vocational goal and the material used be brought in from that field? Or, shall the humanities be the one line of study which may disregard the vocational objects of the college and aim at general citizenship and culture of the broadest type? Another question that I should like to suggest is, should the language and literature be converted from the old three and two hour system to a more intensified plan of study, thus simplifying the schedule to that extent and making less conflicts with other subjects?

I would like to recommend a good general course in classics in English, and also point out the need of a system of prizes in humanistic subjects and debating.

R. J. Sprague,
*Head of Division of the Humanities.*

### The Division of Rural Social Science.

The principal changes in the Department of Agricultural Education during the past year have been the elimination of administrative responsibility for boys' and girls' club work, the addition of two undergraduate courses, the increase of graduate students from one in the previous year to four in the current year, and a decrease in the facilities for doing the undergraduate work in the courses in methods of teaching. There has been a pronounced increase in the demand for the State teacher's certificate. The requests for teachers continue to exceed the supply more than two to one. There has been a greatly increased demand for work in some courses that in previous years attracted no students whatever. Eleven students are now majoring in the department as against five last year. The instruction in all the courses, undergraduate and graduate, in this department and in one course in rural sociology is carried on by one person. The situation calls for relief at once.

During the past year a major has been established in the Department of Agricultural Economics, and already 19 students have registered for major work. The total enrollment in the department for the year was 317. Of these, 11 are graduate students doing either major or minor work. A new course has been given in transportation of agricultural products, dealing with the development of transportation in the United States; highways, waterways, railways and electric ways; the opening of new agricultural areas and industries. The department has prepared, in co-operation with the Federal Office of Markets, a bulletin on the cost of distributing milk in six cities and towns of the State. An abridged edition of this bulletin has been made for general circulation. The head of the department assisted in the preparation of the program of the graduate school of agriculture, which held its biennial session at the college in July. One section, giving four courses and one seminar, was devoted entirely to the discussion of problems of agricultural economics.

The courses offered by the Department of Rural Sociology have been reorganized to meet conditions arising under the three-term basis of college work, and the major in rural sociology was offered for the first time this year. The enrollment in the regular courses for the fall term was more than double that of the enrollment for the first semester of last year. The major has been elected by four men. The chief task of the department for the fall has been the selection and arrangement of material for the required course to be given sophomores in the spring; this work is now practically completed. The department is undertaking a series of studies in rural communities having a large number of foreign-born residents. The first of these studies will have to do with conditions that affect the health of the communities and the improvement of these conditions through community co-operation and organization. There have been a number of calls from within and without the State for help along various lines. These calls have been for information for talks to boys' clubs and other organizations, etc. A course of lectures on types of rural communities and the community survey was given by the head of the department at Teachers College, Columbia University, this summer. This fall a series of evening lectures on community organization was given at the same institution. These lectures in no way interfered with the regular college work here.

KENYON L. BUTTERFIELD,
*Head of the Division.*

## GENERAL DEPARTMENTS REPORTING TO THE PRESIDENT.

### The Library.

The year just ended has been one of unusual activity. The total number of books accessioned is 4,517, the largest annual increase in the history of the library, making a total of 52,928 volumes. More students are making use of the main library and its branches in the department buildings because of increased assignments in connection with their courses of study, and also on account of our better book collections. More library extension work has also been carried on during the past year, — 39 libraries having received 679 books and 49 pamphlets through this phase of our work. During the past year we have issued library leaflets on the following subjects: books for teachers, poultrymen, high schools and farm women, and on soil fertility, garden design and garden making, and farm crops. This means that up to date we have published 23 library leaflets in editions varying from 1,000 to 3,000 copies of each, with a total printing of 32,000 copies.

Our need for a new library building should not be overlooked. Students and teachers become discouraged in the search for material when it becomes necessary to squirm through crowded aisles, climb ladders or resort to the collections stored in the cellar. Visitors, upon looking over our equipment, express surprise at our large and valuable collections being exposed to fire and other dangers, and voice the economic loss of time and energy spent in working under our present conditions. Time flies so fast — so many men have come and gone without getting many of the best things which a good up-to-date library might have offered — that the real situation presented to our research workers, faculty, students and library staff becomes a very serious one indeed. Our earnest hope, for the benefit of the students and teachers who come to us and rightfully expect better working quarters, is that the next Legislature will offer relief in the form of a new library building, complete in all of its appointments, for the proper carrying on of all lines of library work.

Charles R. Green,
*Librarian.*

### Military Department.

There has been a decided improvement in the various drills during the fall term over the work last year. This has been due to the following reasons: —

*First.* — The two additional military courses for cadet officers of the senior and junior classes has enabled me to see that the theoretical part of the outdoor work for each week was prepared and understood by the cadet officers who conducted this work.

*Second.* — Twenty-one students attended the United States training camps at Plattsburg, N. Y., and every captain and many first lieutenants are graduates of these camps.

*Third.* — The recent congressional legislation relative to the reserve officers training corps at colleges has had the effect of stimulating the interest in the military to a great extent.

At the present time the department work is handicapped by a drill hall that was built about thirty years ago, when the college had an enrollment of perhaps 150. It is entirely inadequate for the 400 students in the military department now. The armory and storage rooms are as inadequate as the hall.

H. W. Fleet,
*Professor of Military Science and Tactics.*

### Department of Physical Education and Hygiene.

The work of the department has been conducted through the year along the following lines: —

1. Each student in the entering class was given a physical examination during the first month of the college year, thus reducing the possibility of any injury arising from ignorance. In the examination especial care was taken to detect any defects of the vital organs, sight and hearing. Each person is given a short talk following his examination concerning his condition, the kind of exercise he should have and the proper care of his body.

2. The freshman class was given a course of lectures and written quizzes on personal hygiene during the first term.

3. The physical director has immediate charge of health conditions in the college, seeing that cases of minor illness or injuries are cared for either by the resident nurse at the infirmary or by a member of the Department of Physical Education, the calling of a physician in cases where it seems necessary and sending those cases which need the attention of a nurse to the infirmary, and checking up on all illness and injury by granting the excuses required by the dean for those students who have been absent from classes because of either illness or injury. In matters of general health conditions the physical director is guided by the action of the college health committee and the advice of the Department of Microbiology.

4. During the winter months the department requires three hours of physical exercise per week for each member of the three lower classes. Those men who have been found by physical examination to be physically normal are permitted to elect one of the several athletic activities; those who have been found to be below normal physically are given individual instruction in so far as our present equipment will permit. Walking trips may be substituted for physical exercise in the gymnasium, and during the past year from 150 to 200 students have elected this form of exercise. The work of the indoor classes of from 30 to 40 men each consists of gymnastic exercises, — such games as basketball and indoor baseball.

The physical director is general manager of athletics, supervising arrangements for contests with other colleges, buying supplies for the teams, assisting in the coaching, and having final control over players and games.

The interest in intercollegiate and intramural activities has been steadily growing. An accurate estimate of the participation in all sports during the year shows that in track about 75 men participated; cross country, 50; hockey, 75; baseball, 175; tennis, 25; football, 140; and basketball (other than required gymnasium), 40. After counting out duplications we find that approximately 50 per cent. of the student body voluntarily took part in some form of supervised athletic sport during the year.

The new athletic field is so far toward completion that the entire surface has been open to use this year. This has meant that many more opportunities for out-of-door recreation have been offered than it was ever possible to offer before. The fact that the running track is not completed is the greatest handicap now existing in the development of the general use of the total space. With the completion of the track I think it is very safe to say that the number of men participating in track athletics will be trebled.

The limited quarters in which the regular gymnasium work is to be carried on in the winter season make it impossible to do indoor gymnastics which can compare in any wise favorably with those of other colleges. From December 1 to April 1 the drill hall floor is in almost constant use from 8 o'clock in the morning until 9 o'clock at night.

The immediate pressing need of this department is a suitable gymnasium for the physical training of students during the winter months. Every student should receive gymnastic instruction and training of such a nature as to keep his physical education and development on a par with his mental development. Many of our students who should receive individual attention and treatment are neglected simply because the present building is too small, unsanitary and poorly equipped. A suitable gymnasium with a swimming pool is our greatest need.

The greatest problem of this department is to provide means for our students to follow out the exercises prescribed for them, and require those who are not themselves inclined to take exercise to take some form of systematic exercise at least three times a week. With the completion of the athletic field our ideal of having every student take part in some form of active exercise may be realized for at least half the year, but during the winter months, when there is no military drill, and regular exercise is a necessity, we are confronted with the problem of finding forms of exercise which are possible with our present equipment.

CURRY S. HICKS,
*Professor of Physical Education and Hygiene.*

## The Supervisor of Short Courses.

### A. WINTER SCHOOLS.

Twenty-two courses were offered in the ten weeks' winter courses. The enrollment was 153.

Farmers' week was seriously interfered with by one of the most severe storms of the winter, so that the attendance was about one-half what it should have been.

A bankers' conference was held at the college for the first time. An effort was made to create more interest on the part of bankers in agriculture in the State; the attendance was 28, and we believe the effort was very much worth while.

The tree wardens' school was discontinued.

The county agents' conference, the Polish farmers' day, the apple-packing school and the beekeepers' school were held as usual, with increased attendance and interest.

### B. SUMMER SCHOOLS.

The summer school of agriculture and country life was held with an increase in attendance over previous years of approximately 25 per cent. A good deal of effort was made to arrange the summer school so that it would appeal to groups of workers such as club leaders, rural school teachers, etc., with good success. Some forty-five courses were offered.

The conference on rural organization, usually held as a closing feature of the summer school, was omitted last summer on account of conflicts with work arranged by the graduate school of agriculture. A small conference of the executive officers of the organizations which assist in the conference on rural organization was held in October. At this time plans centering in the work of the Massachusetts Federation for Rural Progress were discussed, and I feel these will show very good results later on.

The college was honored last summer by having the sessions of the American Branch of the English Folk Song and Dance Society held on the campus. Not only did this school bring more than one hundred people in touch with the college, but it also gave those who live in this community an entirely new idea and conception of the place which such things as folk songs and dancing may properly occupy in recreation, especially of our small towns.

## RECOMMENDATIONS.

I can but reiterate what I have said before, but in stronger terms, if possible, as to the desirability and necessity of placing the supervision of the short courses in the hands of some one who can give them his undivided attention. They have grown to the point where to handle them properly would require the full time of a supervisor.

The short courses need better financial support. Heads of departments are calling for more extra instructors, and since they are no longer considered as extension work, they should be supported from the regular college budget.

Some of the shorter courses, however, are so closely connected with the extension work that I feel the new supervisor should have some official relationship to the director of the extension service.

Many demands are coming from different sections of the State, and from various classes of people, to have the short course enlarged. I feel that these demands should be met at the earliest possible moment.

There seems to be need of short courses and extension courses of the following kinds and grades: —

A. Short courses of college grade.
  - For graduates of county agricultural schools.
  - For graduates of departments of agriculture in high schools.
  - For graduates of high schools not eligible to the four-year work.
  - For graduates of liberal arts colleges who desire special work in agriculture.
  - For persons over twenty-one years of age who are not prepared for regular four-year work.

B. Short courses of noncollege grade.
  - One year special technical course, *i.e.*, fruit growing, poultry, etc.
  - Continuation courses one year in length for graduates of county agricultural schools, or a department of agriculture in high school.
  - Winter schools of twelve weeks.
  - Summer schools of two, four, six or twelve weeks.

C. Courses in the nature of conferences or institutes one week or less (might be considered as extension work) such as —
  - Farmers' week.
  - Bankers' convention.
  - Conference of superintendents of State institutions.
  - Officers of farm bureaus.
  - County agents' conferences.
  - Conferences of fertilizer agents.
  - Conferences of milk inspectors.
  - Conferences of feed dealers.
  - Conferences of seed dealers.
  - Conferences of town officers.
  - Conferences of tree wardens.
  - Conferences of rural librarians.
  - Conferences of grange officers.
  - Conferences of judges at fairs.
  - Meetings of rural clergymen.
  - Meetings of county Y. M. C. A. workers.
  - Meetings of county Y. W. C. A. workers.
  - Officers of village improvement associations and for other groups that might be helped by the college.

It is the desire of the college to organize its short course work so that citizens of the State may have a chance to come to the college for help and assistance, be it for a period of three days, three months or for a year.

WILLIAM D. HURD,
*Supervisor of Short Courses.*

### The Director of the Graduate School.

This autumn the enrollment in the graduate school is 57, as compared with 52 of a year ago. Of these, 18 registered for the degree of doctor of philosophy, 29 for the degree of master of science, 5 for the degree of master of agriculture, and 5 registered for no degree. These students come from a wide range of institutions and of territory. Probably we now have more students in the graduate school who were not undergraduates at this college than we have of those who received their degree here. Last June 3 students received the degree of doctor of philosophy and 5 the degree of master of science.

## INSTRUCTION.

Many of our best equipped instructors, who are capable of creative and valuable performance and also are needed in directing and suggesting for others who are beginners, are so burdened with routine duties and teaching that results of vital importance to agriculture are wanting. Daily routine grinding on the part of the instructors does not produce the best environment for undergraduate students, does not instill the right spirit into the graduate students who are destined to become the teachers, investigators and experts of the future, and does not contribute to the type of investigations which agriculture is now demanding. It is very much desired, therefore, that financial relief may come to alter this condition, for time, reflection and freedom for study and research are requisite to promote an agriculture which will be professionally on as high a plane as any other field of activity having science as its basis.

## DEGREES.

It is becoming more and more evident that the work of the institution falls into two broad divisions, one professional and the other scientific (broadly interpreted). Both of these, of course, are based upon the broad subjects which pertain to humanity and culture. These two grand divisions are respectively divided into several subdivisions or specialties. Experts of the most intensive training are demanded in each specialty. Graduate work or study and training are essential to the preparation of these experts, and recognition for this graduate work is measured by degrees.

In the scientific division, the higher degrees of master of science and doctor of philosophy have sufficed for all purposes.

The professional division, however, from time to time calls for more definite designations in order that the degree will specify the particular usefulness of the individual. This institution recognized the growing demand of this professional division by establishing the degrees of master of agriculture and doctor of agriculture, and recently the graduate staff recommended the establishment of the degree of master of landscape architecture. The multiplication of degrees is seemingly reprehensible, but so far has been the only solution of the difficulties. How far this practice of increasing the number of degrees in connection with well-defined specialization should go is a question which no one has the power to answer offhand. The future only can determine the wise course. However this may be, whenever a course stands out conspicuously and apart from other courses and has a peculiar and well-defined purpose, it may be justifiable to create a degree having as much significance as the course which it represents.

When this is considered in the light of the fact that here in the United States very nearly one hundred different degrees are granted, and also when we must admit that the degree is nothing more than a certificate of definite educational attainment and experience, we must then conclude that these peculiarly specific degrees have an economic and educational value.

## General Required Course for Graduate Students.

In a technical institution there is a great tendency to place the limits of education within the circumscribed technical pursuits. Students fail to grasp the broader relations of life and to become appreciative of such thoughts and activities as contribute to its richness and fullness. In order to supply this real want in our educational system in this institution, especially for those whom we are training for experts in the graduate school, a course has been outlined which will extend over three years. The students meet once each week for this period.

This series of studies has been propitiously and satisfactorily initiated by Prof. W. J. Newlin of Amherst College, who has been treating "Ten Great Philosophies" during the first term.

The courses planned are as follows: —

Art.
Literature.
Philosophy.
Logic.
Social Movements.
Philosophy of Science.
Philosophy of Practices.

### Facilities for Graduate Students.

It has become a recognized policy on the part of the agricultural colleges of the country to foster graduate work for those who are intending to pursue some phase of intensive agriculture, whether professionally or scientifically. It is an accepted belief by many, too, that it is very desirable to conduct this advanced work in an atmosphere surcharged with agriculture.

While realizing this to be a good policy, it becomes necessary to consider those facilities which will develop within the graduate students the best type of scholarship and the best results of research.

Some of the departments are having difficulty because of material accommodations. There seems to be a growing feeling on the part of several departments that graduate assistants, at least, should be accommodated with private quarters in order that they may carry on their investigations without constant interference from others. This is especially pertinent at the present time to the Departments of Botany, Chemistry and Entomology. They have tried out a common-room plan for graduate students and have found it unsatisfactory, and would now like such modifications as will correct and improve this feature. Laboratories have found that the best research can be done only in seclusion.

The Department of Chemistry, too, suffers from obsolete physical conditions. The present building is unfit for chemical work as well as extremely dangerous. Students must necessarily suffer from such crude facilities as are available, and especially from those which are lacking entirely. We trust that the time may come in the very near future when these requests may be made real by increased State allowances.

Charles E. Marshall,
*Director.*

## The Director of the Experiment Station.

There have been few changes in major positions on the station staff during the year. The frequent loss of promising assistants has rather seriously interfered with progress in certain lines of work. This loss has been due in almost all cases to the fact that the salaries which we can pay are less than those paid by the Federal government and by similar institutions for work of the same class, or because of the far larger salaries offered in commercial work.

There has been no change in general policy and but little in lines of work in the experiment station during the year. Most of the problems under investigation are fundamental and will require considerable periods of time for thorough study. This, it will be understood, does not mean that results of immediate value in their application to our agriculture are not being secured. Thus, for example, we are studying numerous manurial and fertilizer problems, and in every line new lanes of darkness are constantly disclosed; our results nevertheless enable us meanwhile to give valuable suggestions. Precisely the same situation exists in connection with our study of feeding problems. Indeed, in almost every investigation progress establishes new facts which have a direct bearing upon practice, but at the same time discloses new vistas of needed inquiry. Frequent change in general lines of investigation not only is unnecessary, it would be highly undesirable. The general experimental work now embraces investigations in the following principal lines of inquiry: soil tests with fertilizers with different crops in rotation; comparison of the different materials available as sources respectively of nitrogen, phosphoric acid, potash and lime for both field and garden crops, with a view to determining the ultimate effects of each on the composition of the soil, the micro-organisms it contains and its physical characteristics; comparisons of different systems of fertilizing mowings and orchards; trial of different manures and fertilizers for both tree and bush fruits; comparison of methods of applying manures and fertilizers; variety tests of garden and field crops and fruits; tests of different spray materials and methods of spraying; comparisons of methods of pruning and of cover crops in orchard management; tests of nursery stock from different sources and of different ages; trials of new crops; determinations of the digestibility of feedstuffs; methods of feeding for milk; systems of feeding and management of poultry for eggs; efforts to determine the value and best methods of use of anti hog-cholera serum; studies upon the diagnosis and transmission of avian tuberculosis; co-operation with selected farmers in the trial of crops and systems of fertilizing them.

In addition, the station is working upon certain research problems involving more fundamental and more strictly scientific investigation, and requiring the approval of the director of the Federal Office of Experiment Stations. The following are among the more prominent investigations of this class: —

1. To determine the principles which should underlie practice in the use of fertilizers for the cranberry crop.
2. Work in plant breeding, in the endeavor to produce more rust-resistant types of asparagus. (In co-operation with the Bureau of Plant Industry, United States Department of Agriculture.)
3. The effect of food on the composition of milk and butter fat and on the consistency or body of butter.
4. Why insecticides burn foliage.
5. Effects of meteorological conditions on the development of plants and crops, both in health and disease.
6. Relation of light to burning from spraying with fungicides and insecticides.
7. Relation of light to burning of vegetation from miscible oils.
8. Study of interrelation of stock and scion in apples.
9. The economic importance of digger wasps in relation to agriculture.
10. The diagnosis of white diarrhœa in adult fowls.
11. A study of the presence and disappearance of organic matter in soils; its influence upon fertility.
12. A study of so-called "tobacco sickness."

The last two have been taken up during the past year; the others named have already engaged our attention for some time.

The fertilizer work with asparagus at the substation in Concord has been discontinued, and definite advice, based upon its results, is given in the twenty-eighth annual report. A second distribution in small lots of roots and seed of rust-resistant strains of asparagus developed in this station was made last spring. Reports both from the 1915 distribution and from that of this year, as yet incomplete, are in general favorable; but the fact that neither year was one of abundant rust infestation has prevented what can be regarded as a severe and therefore thoroughly satisfactory test.

The research investigations of mosaic disease of tobacco, it is believed, have demonstrated the active causes and have accordingly made it possible to give advice which we are confident will prevent serious injury from this cause. Dr. Chapman who was engaged in these investigations has, therefore, been authorized to undertake the study of what now seems to be a much more serious obstacle to profitable tobacco growing, — the so-called tobacco sickness, — a trouble which has already rendered success with the crop impossible on a considerable acreage which a few years ago was giving fine crops. In this investigation he is to receive such co-operation from the chemists, bacteriologists and mycologists of the station as developments indicate to be desirable. It is anticipated that the tobacco growers of the valley will endeavor to procure in the next session of the Legislature an appropriation to at least in part support this work.

The participation of the experiment station in the work of the market garden substation promises to develop in many important ways. Little can be done, of course, until the market garden station is thoroughly established and funds have been provided for its maintenance.

During the past year the trustees have authorized the employment of an assistant chemist to work in animal nutrition problems, under the immediate oversight of Dr. J. B. Lindsey. The first work to be undertaken will be an investigation of questions connected with the feeding of horses. Accommodations for this work will be provided by extensive changes already nearly completed in the building formerly used as the station creamery. Mr. C. L. Beals, who has served as assistant in the Department of Chemistry since 1912, has been appointed to the new position, and this line of investigation will begin within a few weeks.

## THE NEEDS OF THE STATION.

*The Purchase of the Tillson Farm and the Provision of Buildings for Experimental Work.* — The Tillson farm is leased on very reasonable terms and the lease still has six years to run. The agreement for lease provides that the college may purchase the farm at any time within the six years, and for a price which does not exceed its normal market value. The purchase can be consummated at so reasonable a price that to fail to complete the transaction would be very short-sighted business policy. In view, however, of the fact that the option still has six years to run, it might be thought that purchase in the near future is not urgent. The fact is, however, that but very little experimental work on this farm will be possible except at very great disadvantage previous to the provision of buildings to be used in connection with the work. It would self-evidently be more than questionable as a matter of business policy to erect buildings on the farm so long as any uncertainty exists as to the ultimate acquisition of the property. It has been found absolutely necessary to make a few changes and repairs in the small cottage and to reshingle the tobacco shed standing on the property. These changes and repairs have cost rather over $500. Before we can undertake much experimental work on the farm — and we have a considerable number of pressing problems the solution of which we should undertake there — we shall find it necessary to erect a barn; and a house for the superintendent should also be provided. For the purposes indicated, the estimated sums needed are as follows: —

| | |
|---|---|
| Purchase price of farm (definite agreement), | $5,000 |
| Dwelling house for superintendent, | 4,000 |
| Barn and outbuildings, | 6,000 |
| Total, | $15,000 |

*Land for Experimental Work with Poultry.* — The need for additional land for experimental work with poultry, several times referred to in earlier reports, yearly becomes more imperative. The problems of breeding upon which we are engaged necessitate the rearing of very large numbers of birds, and these to serve the purpose in view must be vigorous and healthy. Such stock is practically assured if chicks from sound birds can be reared on fresh range, but can hardly be secured otherwise. Since the area now available for poultry work is so small that the provision of satisfactory range within its limits is impossible, the lease of additional land is the only alternative if the work is to be successfully prosecuted, — an alternative unsound for business reasons which have previously been stated, and involving other serious disadvantages, chief among which is distance from the poultry center of the institution. The needs of this important branch of our work will be met only when we are provided with a farm for experimental purposes of sufficient size to allow the necessary rotations in the use of its different parts to insure uncontaminated areas annually for rearing experimental stock. The head of the department believes — and in his estimate I coincide — that at least sixty acres will be required. The amount of money which will be needed to purchase the required amount of satisfactory land is at present a matter of great uncertainty, but I do not feel that it will be prudent to estimate it at less than $8,000.

*The Tuxbury Land.* — The Tuxbury property, now leased for orchard experiments, should be acquired by purchase in the near future. The reasons have been previously stated in some detail. Both sound business policy on the part of the State and such security of tenure as will insure against untimely interruption to the work require that this be done. The estimated cost is $12,000.

*Orchard Trees for the Entomological Department.* — For the research work of the Entomological Department on insecticides, it is essential that about one acre planted to fruit trees of different kinds be placed under its absolute control. Experience has indicated that only under such control is it possible to obtain results in the integrity of which absolute confidence can be placed. The nature of the investigation is such, and the number of visits for treatment and observation required is so great, that if possible a location near the headquarters of the department should be secured. It is hoped that this need can be met by assignment of orchard already planted and now the property of the institution.

*Land for Tobacco Investigations.* — Reference has been made in this report to the investigation of tobacco sickness which has recently been begun. In connection with this investigation a moderate amount of plot work will be essential; but since this in the nature of things must for the most part be located on land which is suffering from the trouble under investigation, and since work in a number of different localities will be desirable, it seems best to lease rather than to undertake to purchase the land needed in this investigation. The estimated cost for the year 1917 is $350.

*Buildings and Equipment for Market-garden Work.* — The necessity for buildings — most important being glass houses adapted to vegetable growing — and equipment for the market-garden work has been referred to. This need cannot be met out of the current resources of the station without such degree of curtailment in other directions as is clearly impracticable.

*Additional Experimental Work with Poultry.* — There is much demand for an increase in the amount of our experimental work with poultry, far greater than can be met with present resources. An annual grant of $2,000 for this purpose is much to be desired. It is believed and hoped that the poultry keepers of the State will endeavor to secure such an appropriation.

*Increases in Station Staff.* — If the station is to meet the constantly increasing demands upon it on the part of the public, a gradual increase in the station staff must be provided for. There is already decided pressure for experimental work in rural engineering, in floriculture and in forestry. This demand with our present resources cannot now be met, but the following increases in station staff are so urgently needed that an effort is to be made to provide for them out of current funds: namely, a curator and a field pathologist in the Department of Botany; a high-grade assistant in the Department of Entomology; one graduate assistant each in the Departments of Agricultural Economics and Microbiology; and a stenographer for six months in each year — from May 1 to November 1 — for the cranberry substation. The dates at which it is hoped the employment of each can be made effective, and the estimated annual salaries, are as follows: —

| | |
|---|---|
| Curator, Department of Botany, from Dec. 1, 1916, | $900 |
| Field pathologist, Department of Botany, from April 1, 1917, | 1,200 |
| Assistant, Department of Entomology, from July 1, 1917, | 1,800 |
| Graduate assistant, Department of Agricultural Economics, from July 1, 1917, | 420 |
| Graduate assistant, Department of Microbiology, from July 1, 1917, | 420 |
| Stenographer, cranberry substation, from May 1, 1917, | 300 |

I feel that attention should be called in conclusion to the fact, which finds illustrations in this experiment station, that a high degree of fruitfulness in investigation is not often realized except with a corresponding degree of concentration. Of course, the individual talent and characteristics will always largely determine the result; but these being equal, one man devoting practically all of his time to investigation will accomplish several times more than two men devoting one-half time to that line of work and subject to constant interruptions. This matter has frequently been under discussion in the annual conventions of experiment station directors and workers, and it will not surprise those who know the laws of the human mind that the views just expressed meet general acceptance. It is my belief that the following statement of policy is sound and that our efforts should be increasingly directed toward its early realization.

### THE STATION STAFF.

1. It should be the policy of the station in its main lines of investigation to employ in the work men who shall give their entire time to such work. This does not mean that in some cases station men may not do some teaching or extension work, but such work should be restricted to narrow limits. Experience in all stations has shown that a man will be fruitful as an investigator only if his time is but very little taken up by calls upon him for service in other directions. The teaching expected of station men should at most occupy only a small proportion of their time, and as a rule should be confined to advanced work and for the most part to graduate students engaged in research under them. An investigator should not be subject to frequent calls for extension service. Such calls lessen efficiency in sta-

tion work to a degree altogether disproportionate to the apparent consumption of time.

2. The division of individual salaries between college and station should be avoided as far as possible. Those men who are recognized as primarily engaged in college work should be paid exclusively from college funds, and, on the other hand, those men engaged primarily in station work, even though they do some college or extension work, should be paid exclusively from station funds. They should be recognized as station men and should be responsible through the heads of their respective departments to the director of the station. Equity as between college and station on the financial side can be easily provided for on the general principles above stated.

In making the statement concerning the needed increases in the station staff, the gradual realization of this policy has been in mind, and full provision for these increases will be an important step toward its realization.

William P. Brooks,
*Director.*

## The Director of the Extension Service.

In presenting this report I have not attempted, as in former years, to describe the work of the extension service, but confine the discussion to what seems to me to be some of the significant features of our work of the past year.

The extension work of the past year has not been characterized by expansion. Lack of funds prevented the starting of any new lines of work. I do not feel, however, that the work has stood still nor gone backward. The year has been rather one of opportunity to "take stock," and to organize the extension work in its relationships to other departments of the college and to other agencies throughout the State on a far better and more satisfactory basis than formerly. Our extension specialists have studied their fields more thoroughly, have considered their work in its relationship to rural development, and have organized their work with greater care than in the past. And so I feel that very great progress has been made toward developing a State-wide unified and harmonious system of extension teaching for the Commonwealth.

## SOME OF THE MORE IMPORTANT FEATURES OF THE WORK DURING 1916.

Several significant features of the work seem to suggest themselves.

1. *County Agent Work.* — The year has been one of marked progress in the organization of farm bureaus. Three new organizations have been started. None have failed. Middlesex, Dukes and Nantucket are the only counties not organized. The first of these will incorporate an organization on December 16. The work in the farm bureaus has been placed on a written project basis, relationships are more clearly defined, farm bureau officers have a better idea of the purpose of their bureaus, the county agents know their field better and are restricting their efforts to fewer lines of work. A significant thing has been the growth of work for women in four counties. Two other counties are to place agents in the field soon.

2. *Junior Extension Work.* — The boys' and girls' club work continues to be our largest and perhaps most popular activity. The development of junior extension work under the wise direction of Mr. Farley will, I think, far surpass any of the work done in the past, although the enrollment may not be so large as in previous years.

There is need of securing the passage of a law giving aid to towns or districts to help maintain supervisors, for adequate follow-up work is in our judgment the thing most needed at present.

3. *Co-operation between the College and the State Board of Agriculture.* — I cannot help but feel that the efforts to bring the trustees of the college and the members of the Board of Agriculture together, in order that there might be a division of labor, a definition of the field each organization is to cover, and the fact that these two boards have met in the spirit already shown, is really one of the achievements of the year.

4. *Rural Organization.* — More progress has been made in organized movements in agriculture in the Commonwealth during the past year. Thirteen new co-operative organizations for buying and selling have been brought into existence; 30 are

now in successful operation. College men and county agents have been leaders in the movement to organize the milk producers. Our publication on "The Cost of Milk Production" and the advance copy of "The Cost of Milk Distribution" have been taken as the authority on which to discuss the situation by all parties concerned. Especial mention should be made here of the great piece of work which has been done by the county agents in organizing the milk producers of the State and in bringing about a better adjustment of the dairy situation during the past few weeks.

5. *Local Community Organization.* — A goodly portion of Professor Morgan's time the past year has gone into important service connected with the development committee and the Massachusetts Federation for Rural Progress. The local community organization work, therefore, has not been prosecuted with the same vigor as in the previous year. Neither has the proper amount of follow-up work been put on communities which had become partially organized. I doubt whether we can afford to neglect the community organization work.

6. *Committee on Publications.* — The committee on publications has been supervising the issuing of all our publications, and I feel that our extension publications are now being issued on a standard which will bear comparison with any others in this country.

7. *Finances.* — Notwithstanding that we have had so many calls for more work, the fact that we came through the year with a balance of $2,572.75, in addition to the reserve and emergency fund, is worth mentioning.

8. *University Extension for the Connecticut Valley.* — During the year this college has joined with Amherst, Smith, Mount Holyoke, the International Y. M. C. A. College, and the Northfield institutions in a co-operative movement to offer university extension work to the people of the Connecticut valley and adjacent towns. This is in accordance with plans suggested by the University Council of Massachusetts for State-wide extension work. A large and comprehensive announcement has been distributed. The University Extension Bureau of the State Board of Education has assigned an agent to organize the work. His headquarters are at this college.

9. *Relationships to the United States Department of Agriculture.* — Our relationships to the United States Department of Agriculture have been most friendly and satisfactory. The work which they have desired to do has generally been carried on in accordance with the general memorandum of understanding, and minor difficulties have been quite easily adjusted.

10. *National Dairy Show.* — The coming of the national dairy show to Springfield seemed to place a peculiar obligation on this college. Ten or more members of our faculty put in a large amount of time in helping to make the show a success. I estimate that we spent between $2,000 and $3,000 in time and money in the work that we did.

## Comments on the Work.

There are many problems which we are facing now and will have to face in the immediate future.

Perhaps the most important of these is adequate financial support for extension work. During the past year the following amounts have been spent for extension work in this State: —

| | | |
|---|---|---|
| 1. State funds (apportionment 1915–16), | | $43,032 59 |
| 2. Smith-Lever funds, | | 12,930 75 |
| 3. United States Department of Agriculture co-operative demonstration funds, | | 17,026 00 |
| 4. Funds raised by county organizations: — | | |
| (*a*) County funds, | $37,200 00 | |
| (*b*) Funds raised from other sources, | 28,900 00 | |
| | | 66,100 00 |
| Total, | | $139,089 34 |

The above sums do not include the appropriation of $50,000 made to the State Board of Education for extension work, the amount spent by the Board of Agriculture in the educational work which it does, the money expended by the county schools of agriculture and vocational departments, nor the money being spent by commercial concerns and individuals.

I feel that in a short time all these agencies will be called to account, and that every effort should be made to hold our college extension work, and also that carried on by organizations with which we co-operate, to such lines as can be justified before any Legislature or commission.

There are problems of adjustment to be still worked out as between the college, the State Board of Education, the State Board of Agriculture and other organizations, but these things I believe to be only a matter of time.

The relationships between our extension specialists and the county agents comprise a question which is being solved, and in my judgment, as county agent work finds its level these relationships will be easily adjusted. In fact, this problem is working itself out. Unless every county organization in this State is to maintain a corps of specialists comparable in number to the extension service of the college, the problem seems to me to be a rather simple one.

In what has been said I would not convey the impression that the organization of extension work in this institution has been perfected. Much progress has been made in the past year. A complete reorganization of our work into divisions co-ordinate with county agent work and junior extension work, with the idea of really taking hold of the organization of rural problems, will perhaps be the next step. However, little can be done in this direction until there is some relief given to the extremely stringent financial condition in which we find ourselves placed. The college through its extension work will no doubt function more and more as an organizer and administrator of large State-wide movements designed to affect the rural life of the State.

This college should extend its efforts to prepare men for service in the extension work field. There no doubt will be a large call for assistant county agents in the future, and for various lines of work which may be carried on under the Smith-Lever act in other States.

In conclusion, I can but reiterate what I have said before, that at the present time extension work in Massachusetts is organized on a fairly satisfactory basis. The extension service within the college articulates with the other activities of the college and station. Harmonious relationships exist between the college, the United States Department of Agriculture, the other State organizations and the farm bureaus. Differences in opinion as to what work should be done, and the best methods of organizing, are being worked out in a frank, friendly spirit.

The call is even stronger than a year ago for the development of several new lines of work and for the better support of lines already started. Among the extension specialists most needed are: —

A supervisor of "itinerant instruction" to organize extension schools, exhibits, lecture courses, etc.

An extension specialist to work with the other State institutions, as mentioned in previous reports.

More extension specialists in correspondence courses, poultry husbandry, fruit growing, farm management demonstrations and home economics.

More supervision in the junior extension work.

Additional extension specialists for agronomy, injurious insects and diseases, beekeeping, work with foreigners, and also as advisers to such organizations as the Homestead Commission and others.

Also considerable more clerical assistance.

The cost of maintaining this extra work would be from $40,000 to $50,000 in addition to what we are now receiving. The detailed estimates were made by me in the 1914 and 1915 reports.

It is to be hoped that the work of the past seven years will have proved its value, so that Legislatures in the not distant future will take care of these ever-growing demands for work which means developing the industries of the State.

I wish, as in former years, to mention and commend the spirit shown by the extension specialists and the untiring energy which they put into developing their work. As I look over the extension work of other colleges, I fail to find a corps of workers more devoted to their tasks or more loyal to their institutions than are the men and women who make up our staff.

William D. Hurd,
*Director.*

# TABLES AND STATISTICS.

## TABLE I. — *New Appointments.*

### *A. In the Academic Departments.*

| POSITION. | Name. | Institution from which graduated and Degrees. |
|---|---|---|
| Instructor in zoölogy, | Stanley C. Ball, | Ph.B., Sheffield Scientific School, 1911; Ph.D., Yale University, 1915. |
| Instructor in dairying, | Harry D. Drain, | B.Sc.Agr., Ohio State University, 1913. |
| Field agent,[1] | Charles H. Gould, | B.Sc., Massachusetts Agricultural College, 1916. |
| Assistant in agricultural economics, | Ralph P. Hotis,[2] | B.Sc., Massachusetts Agricultural College, 1915. |
| Instructor in botany, | George W. Martin, | Litt.B., Rutgers College, 1912; M.Sc., Rutgers College, 1915. |
| Assistant in rural sociology,[1] | Joseph Novitski, | Oshkosh, Wis., State Normal School. |
| Assistant professor of English, | Charles H. Patterson, | A.B., Tufts College, 1887; A.M., Tufts College, 1893. |
| Assistant in English,[1] | Philip W. Payne, | A.B., Amherst College, 1914. |
| Shop assistant, rural engineering,[1] | George F. Pushee, | - - - |
| Instructor in poultry husbandry,[1] | Everett H. Rucker, | B.Sc., University of Missouri, 1915; A.M., University of Missouri, 1916. |
| Instructor in agricultural economics, | Ralph M. Rutledge, | B.Sc., Oregon Agricultural College, 1914; M.Sc., University of Wisconsin, 1915. |
| Assistant professor of horticulture,[1] | John T. Wheeler, | B.Sc., University of Wisconsin, 1916. |

### *B. In the Experiment Station.*

| | | |
|---|---|---|
| Assistant chemist, | Windom A. Allen, | B.Sc., Tufts College, 1916. |
| Assistant in veterinary science, | John B. Lentz, | A.B., Franklin and Marshall College, 1908; V.M.D., University of Pennsylvania, 1914. |
| Assistant chemist, | John B. Smith, | B.Sc., Tufts College, 1916. |

### *C. In the Extension Service.*

| | | |
|---|---|---|
| Extension associate professor of agricultural economics. | Edward F. Damon, | B.Sc., Massachusetts Agricultural College, 1910. |
| Supervisor of junior extension, | George L. Farley, | B.Sc., Dartmouth College, 1898; M.Sc., Dartmouth College, 1903. |
| Extension instructor in pomology, | Austin D. Kilham, | A.B., Drury College, 1913; B.Sc. University of Missouri, 1914. |
| Extension instructor in civic improvement. | Frank A. C. Smith, | B.Sc., Cornell University, 1912; M.L.A., Harvard University, 1914. |
| Extension instructor in charge of pig club work. | Victor A. Rice,[3] | - - - |
| Extension instructor in charge of poultry club work. | Roswell W. Henninger,[4] | - - - |

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[1] New positions.

[2] Temporary employment from March to June.

[3] Services to begin Dec. 4, 1916.

[4] Services to begin Jan. 1, 1917.

## TABLE I. — *New Appointments* — Concluded.

### *D. In the Clerical Staff.*

| POSITION. | Name. |
|---|---|
| Chief clerk, Extension Service, | Elbert L. Arnold. |
| Clerk, Division of Horticulture, | Eleanor Barker. |
| Clerk, president's office, | Evelyn Brewster. |
| Stenographer, Extension Service,[1] | Doris Clark. |
| Cataloguer, library, | Lalia M. Damon. |
| Inventory clerk, treasurer's office,[1] | Maude Chambers. |
| Assistant, Department of Physical Education,[1] | Llewelyn L. Derby. |
| Stenographer, Division of Agriculture, | Hazel Dewar. |
| Clerk, graduate school, | Marion F. Dondale. |
| Stenographer, Department of Dairying,[1] | Katherine L. Fenton. |
| Stenographer, office of the dean and registrar,[1] | Margaret T. Gaskell. |
| Clerk, Department of Agricultural Economics, | Laura M. Hager. |
| Clerk, Division of Agriculture, | Mary G. Hanifin. |
| Clerk, Extension Service, | Ethel L. Kennedy. |
| Stenographer, Department of Entomology,[1] | Helen A. Martin. |
| Stenographer, Extension Service, | Gladys Miner. |
| Clerk, Department of Botany, | Grace B. Nutting. |
| Stenographer, Extension Service, | Marion Pomeroy. |
| Assistant, library, | Vivian L. Roy. |
| Stenographer, Division of Horticulture, | Ethelyn Streeter. |
| Clerk, Extension Service, | Flora E. Torrey. |
| Assistant, library, | Ethel M. Turner. |

[1] New positions.

## TABLE II. — *Resignations.*

| POSITION. | Name. |
|---|---|
| Instructor in dairying, | Harold E. Baldinger. |
| Instructor in zoölogy and geology, | Frank N. Blanchard. |
| Extension instructor in charge of boys' and girls' pig club work, | Eric N. Boland.[1] |
| Clerk, Division of Agriculture, | Frances C. Boynton. |
| Clerk, president's office, | Bertha A. Brockhaus. |
| First clerk, Extension Service, | Mabel R. Case. |
| Cataloguer, library, | Ada M. Chandler. |

[1] Takes effect Dec. 2, 1916.

### TABLE II. — *Resignations* — Concluded.

| POSITION. | Name. |
|---|---|
| Stenographer, Extension Service, | Phyllis J. Cogswell. |
| Clerk, Department of Botany, | Jessie V. Crocker. |
| Assistant chemist, experiment station, | Charles W. Davis. |
| First Clerk, Division of Agriculture, | Alice M. Gilbert. |
| Clerk, Extension Service, | Hannah M. Griffin. |
| Professor of agronomy, | Sidney B. Haskell. |
| Assistant in agricultural economics, | Ralph P. Hotis. |
| Clerk, graduate school, | Esther L. Houghton. |
| Extension professor of agricultural education, | Orion A. Morton. |
| Assistant in veterinary science, experiment station, | Beryl H. Paige. |
| Stenographer, Extension Service, | Marion Pomeroy. |
| Assistant in agricultural economics, | Frederick W. Read. |
| Extension instructor in pomology, | Ralph W. Rees. |
| Assistant chemist, experiment station, | Rudolph W. Ruprecht. |
| Clerk, Division of Horticulture, | Gladys E. Russell. |
| Stenographer, Extension Service, | Elsa Slattery. |
| Clerk, Department of Floriculture, | Dorothy F. Smith. |
| Assistant professor of English, | Henry E. Smith. |
| Assistant in botany, | Raymond G. Smith. |
| Professor of botany, | George E. Stone. |
| Assistant in veterinary science, experiment station, | Arnold P. Sturtevant. |

### TABLE III. — *Change in Title of Officers of the Institution.*

| NAME. | Former Title. | Present Title. |
|---|---|---|
| Ernest Anderson, | Associate professor of general and physical chemistry. | Professor of general and physical chemistry. |
| Paul J. Anderson, | Assistant professor of botany, | Associate professor of botany and associate plant pathologist. |
| Thomas Butterworth, | Assistant engineer, | Engineer. |
| George H. Chapman, | Assistant botanist, | Research physiologist. |
| Orton L. Clark, | Assistant botanist, experiment station. | Assistant professor of botany and assistant plant physiologist. |
| Harold M. Gore, | Assistant in physical education, | Instructor in physical education. |
| Marion Guertin, | Stenographer, section of beekeeping. | Clerk, section of beekeeping. |
| Burt A. Hazeltine, | Assistant in mathematics, | Instructor in mathematics. |
| Curry S. Hicks, | Associate professor of physical education and hygiene. | Professor of physical education and hygiene. |
| Arao Itano, | Assistant in microbiology, | Instructor in microbiology. |

TABLE III. — *Change in Title of Officers of the Institution* — Concluded.

| NAME. | Former Title. | Present Title. |
|---|---|---|
| A. Vincent Osmun, | Associate professor of botany, | Professor of botany and botanist. |
| Sumner R. Parker, | Assistant State leader and extension professor of rural organization. | Extension professor of rural organization and county agent leader. |
| Loyal F. Payne, | Instructor in poultry husbandry, | Assistant professor of poultry husbandry. |
| Charles A. Peters, | Associate professor of inorganic and soil chemistry. | Professor of inorganic and soil chemistry. |
| Aurelia Wentworth, | Stenographer, Division of Agriculture. | First clerk, Division of Agriculture. |

## TABLE IV. — *Speakers for the Year.*

### *A. Speakers at Wednesday Assembly for Year ending Nov. 30, 1916.*

**1915.**

Dec. 1. — President Kenyon L. Butterfield.
Dec. 8. — Student forum.
Dec. 15. — Hon. Elmer A. Stevens, Boston, Mass.

**1916.**

Jan. 5. — Prof. John Phelan, M. A. C.
Jan. 12. — Hon. Francis Neilson, M. P., England.
Jan. 19. — Mr. Francis B. Sayre, Williamstown, Mass.
Jan. 26. — Mr. Jerome Kidder and colored quartet from Hampton Institute, Va.
Feb. 9. — Student forum.
Feb. 16. — Mr. Raymond Robins, Chicago, Ill.
Feb. 23. — Dr. W. H. Jordan, Geneva, N. Y.
Mar. 1. — Mr. Lucius Wilson, Springfield, Mass.
Mar. 8. — Prof. Robert J. Sprague, M. A. C.
Mar. 15. — Prof. Alva Agee, New Brunswick, N. J.
Mar. 22. — President J. H. F. Main, Grinnell College, Iowa.
Apr. 5. — President Kenyon L. Butterfield.
Apr. 12. — Mr. Clarence P. Shedd, Boston, Mass.
Apr. 26. — Mr. Harry W. Kimball, Boston, Mass.
May 3. — Hon. James Wilson, Iowa.
May 10. — Judge Michael J. Murray, Boston, Mass.
May 17. — Prof. Talcott Williams, Columbia University, New York City.
May 24. — Hon. John Hays Hammond, New York City.
May 31. — President Kenyon L. Butterfield.
June 7. — Student forum.
Sept. 27. — President Kenyon L. Butterfield.
Oct. 4. — Dean Edward M. Lewis, M. A. C.
Oct. 11. — President Kenyon L. Butterfield.
Oct. 18. — Mr. Fred B. Freeman, New York City.
Oct. 25. — Mr. George W. Coleman, Boston, Mass.
Nov. 1. — Student forum.
Nov. 8. — Mr. Henry H. White, Amherst, Mass.
Nov. 15. — Dean William M. Warren, Boston University, Boston, Mass.
Nov. 22. — Hon. Samuel J. Elder, Boston, Mass.

## TABLE IV. — *Speakers for the Year* — Concluded.

### *B. Speakers at Sunday Chapel for Year ending Nov. 30, 1916.*

**1915.**

Dec. 5. — Rev. J. Stanley Durkee, Campello, Mass.
Dec. 12. — Prof. Walter Rauschenbusch, Rochester, N. Y.

**1916.**

Jan. 9. — Dr. Hubert C. Herring, Boston, Mass.
Jan. 16. — Rev. Rockwell H. Potter, Hartford, Conn.
Jan. 23. — Rev. Roger S. Forbes, Dorchester, Mass.
Jan. 30. — Rev. Frank W. Merrick, Danvers, Mass.
Feb. 13. — Rev. E. A. E. Palmquist, Cambridge, Mass.
Feb. 20. — Rev. H. Stiles Bradley, Worcester, Mass.
Feb. 27. — Prof. Benjamin T. Marshall, Dartmouth College, Hanover, N. H.
Mar. 5. — Rev. E. F. Sanderson, Brooklyn, N. Y.
Mar. 12. — Rev. J. Herman Randall, New York City.
Mar. 19. — Dr. Cornelius H. Patton, Boston, Mass.
Apr. 9. — Rev. Christian F. Reisner, New York City.
Apr. 16. — Rev. J. Ross Stevenson, Princeton, N. J.
Apr. 23. — Dr. Lee W. Beattie, New York City.
Apr. 30. — Rev. A. P. Reccord, Springfield, Mass.
Oct. 1. — President Kenyon L. Butterfield.
Nov. 12. — Dr. Richard C. Hughes, Madison, Wis.
Nov. 19. — Rev. Clarence J. Hawkins, Jamaica Plain, Mass.
Nov. 26. — Mr. Fred B. Smith, New York City.

## TABLE V. — *Attendance.*

### *A. In Work of College Grade.*

| | Registration Nov. 30, 1915. | Registration Nov. 30, 1916. |
|---|---|---|
| Senior class, | 108 | 104 |
| Junior class, | 110 | 138 |
| Sophomore class, | 162 | 174 |
| Freshman class, | 211 | 170 |
| | 591 | 586 |
| Graduate students, | 52 | 57 |
| Unclassified students, | 25 | 29 |
| Vocational poultry students, | – | 8 |
| | 668 | 680 |

### *B. Short-Course Enrollment and Convention Registration.*

| | 1915. | 1916. |
|---|---|---|
| Winter school, | 182 | 153 |
| Farmers' week, | – | 980 |
| Beekeepers' school, | – | 10 |
| Polish farmers' day, | – | 220 |
| Apple-packing school, | 19 | 8 |
| County agents' conference, | 38 | 55 |
| Bankers' conference, | – | 28 |
| Summer school of agriculture and country life, | 162 | 170 |
| Conference on rural community planning, | 261 | – |
| Conference on rural organization, | – | 38 |
| School for rural social service, | 14 | 35 |
| Poultry convention, | 600 | 268 |
| School for library workers, | 25 | – |
| Boys' camps, | 92 | 88 |
| Girls' camps, | 13 | 27 |
| | 1,406 | 2,080 |

## TABLE VI. — *Legislative Budget, 1916.*

| ITEMS. | Amount asked. | Amount granted. |
|---|---|---|
| Completion of power plant, | $35,000 | $4,200 |
| Library and equipment, | 230,000 | – |
| Rural engineering shops, | 12,000 | 12,000 |
| Student dormitory, | 40,000 | – |
| Miscellaneous improvements and new equipment, | 60,000 | 20,000 |
| Extra labor, Saturday half-holiday, | 5,000 | – |
| Mount Toby forest tract, | 30,000 | 30,000 |
| | $412,000 | $66,200 |

## TABLE VII. — *Statistics of Freshmen entering Massachusetts Agricultural College, September, 1916.*

### *A. Home Addresses of Students (classified by Towns and Cities).*

| | |
|---|---|
| Acushnet, | 1 |
| ALBANY, N. Y., | 1 |
| Amherst, | 10 |
| Arlington, | 3 |
| Atlantic, | 1 |
| Belchertown, | 2 |
| Bolton, | 1 |
| BOSTON, | 10 |
| Boylston, | 1 |
| Braintree, | 1 |
| Bridgewater, | 1 |
| BROCKTON, | 2 |
| Buckland, | 1 |
| Byfield, | 1 |
| Canton, | 1 |
| CANTON, CHINA, | 1 |
| Clinton, | 1 |
| Dana, | 1 |
| Dighton, | 1 |
| Easthampton, | 1 |
| Easton, | 1 |
| Egypt, | 1 |
| FALL RIVER, | 1 |
| Farmington, Conn., | 1 |
| Florence, | 1 |
| Framingham, | 5 |
| Gardner, | 1 |
| Gleasondale, | 1 |
| Grafton, | 1 |
| Great Barrington, | 6 |
| Greenwich, Conn., | 1 |
| Groton, | 1 |
| Hardwick, | 1 |
| Harrisville, R. I., | 1 |
| HARTFORD, CONN., | 1 |
| HAVERHILL, | 1 |
| Holden, | 1 |
| HOLYOKE, | 2 |
| Hopedale, | 1 |
| Jefferson Valley, N. Y., | 1 |
| Kingston, | 1 |
| Lancaster, | 1 |
| LAWRENCE, | 1 |
| Lee, | 1 |
| Leicester, | 1 |
| LEOMINSTER, | 1 |
| LOWELL, | 3 |
| Lunenburg, | 1 |
| LYNN, | 1 |
| MALDEN, | 3 |
| Manchester, | 1 |
| MARLBOROUGH, | 2 |
| Maynard, | 2 |
| MELROSE, | 4 |
| Milford, | 1 |
| Millbury, | 1 |
| Millville, N. J., | 1 |
| Montvale, N. J., | 1 |
| NEWBURYPORT, | 2 |
| NEWPORT, R. I., | 1 |
| NEWTON, | 3 |
| NEW YORK CITY, N. Y., | 1 |
| NORTH ADAMS, | 1 |
| Norwell, | 1 |
| Old Westbury, L. I., N. Y., | 1 |
| Peabody, | 1 |
| PITTSFIELD, | 4 |
| Plainville, | 1 |
| Port Chester, N. Y., | 1 |
| PORTLAND, ME., | 1 |
| Raynham Centre, | 1 |
| Reading, | 1 |
| Royalston, | 1 |
| RUTHERFORD, N. J., | 1 |
| San Antonio, Tex., | 1 |
| Sandwich, | 2 |
| Sandy Hook, Conn., | 1 |
| Santo Domingo, | 1 |
| Shelburne, | 1 |
| Sherborn, | 1 |
| Shrewsbury, | 1 |
| Somerset, | 1 |
| SOMERVILLE, | 3 |
| SPRINGFIELD, | 5 |
| Stamford, Conn., | 1 |
| Sunderland, | 1 |
| Syracuse, Ind., | 1 |
| TAUNTON, | 3 |
| Waban, | 1 |
| Walpole, | 1 |
| WALTHAM, | 1 |
| Wareham, | 1 |
| Warren, | 1 |
| Warwick, R. I., | 1 |
| Waverley, | 1 |
| Wellesley, | 2 |
| West Bridgewater, | 1 |
| West Springfield, | 1 |
| Whitinsville, | 1 |
| Whitman, | 1 |
| Williamsburg, | 1 |
| Williamstown, | 2 |
| Winchester, | 3 |
| Winthrop, | 1 |
| Wollaston, | 3 |
| Woods Hole, | 1 |
| WORCESTER, | 2 |

### Table VII. — *Statistics of Freshmen, etc.* — Continued.

#### *B. Home Addresses (classified by States).*

| | Number. | Per Cent. | | Number. | Per Cent. |
|---|---|---|---|---|---|
| China, | 1 | .59 | New York, | 5 | 2.94 |
| Connecticut, | 5 | 2.94 | Rhode Island, | 3 | 1.76 |
| Indiana, | 1 | .59 | Santo Domingo, | 1 | .59 |
| Maine, | 1 | .59 | Texas, | 1 | .59 |
| Massachusetts, | 149 | 87.65 | | 170 | 100.00 |
| New Jersey, | 3 | 1.76 | | | |

#### *C. Home Addresses (classified by Counties of Massachusetts).*

| | Number. | Per Cent. | | Number. | Per Cent. |
|---|---|---|---|---|---|
| Barnstable, | 3 | 2.01 | Middlesex, | 38 | 25.50 |
| Berkshire, | 14 | 9.40 | Norfolk, | 9 | 6.04 |
| Bristol, | 9 | 6.04 | Plymouth, | 9 | 6.04 |
| Essex, | 8 | 5.37 | Suffolk, | 12 | 8.05 |
| Franklin, | 3 | 2.01 | Worcester, | 21 | 14.09 |
| Hampden, | 8 | 5.37 | | 149 | 99.99 |
| Hampshire, | 15 | 10.07 | | | |

#### *D. Nativity of Parents.*

| | Number. | Per Cent. |
|---|---|---|
| Neither parent foreign born, | 124 | 72.94 |
| Both parents foreign born, | 33 | 19.41 |
| Father (only) foreign born, | 7 | 4.12 |
| Mother (only) foreign born, | 6 | 3.53 |
| | 170 | 100.00 |

#### *E. Education of Father.*

| | Number. | Per Cent. |
|---|---|---|
| Common school, | 83 | 48.82 |
| High school, | 41 | 24.12 |
| Business school, | 13 | 7.65 |
| College or university, | 28 | 16.47 |
| No statistics, | 5 | 2.94 |
| | 170 | 100.00 |

## TABLE VII. — *Statistics of Freshmen, etc.* — Continued.

### *F. Religious Census.*

| | MEMBERSHIP. | | PREFERENCE. | | TOTALS. | |
|---|---|---|---|---|---|---|
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. |
| Baptist, | 13 | 7.65 | 8 | 4.71 | 21 | 12.35 |
| Catholic, | 14 | 8.24 | – | – | 14 | 8.24 |
| Congregationalist, | 46 | 27.06 | 31 | 18.24 | 77 | 45.29 |
| Episcopal, | 13 | 7.65 | – | – | 13 | 7.65 |
| Hebrew, | 4 | 2.35 | 3 | 1.77 | 7 | 4.12 |
| Methodist, | 10 | 5.88 | 5 | 2.94 | 15 | 8.82 |
| Presbyterian, | 3 | 1.77 | 1 | .59 | 4 | 2.35 |
| Unitarian, | 3 | 1.77 | 1 | .59 | 4 | 2.35 |
| Universalist, | 1 | .59 | 3 | 1.77 | 4 | 2.35 |
| Miscellaneous, | 3 | 1.77 | 4 | 2.35 | 7 | 4.12 |
| No statistics, | – | – | – | – | 4 | 2.35 |
| | 110 | 64.73 | 56 | 32.96 | 170 | 99.99 |

### *G. Occupation of Father.*

| | Number. | Per Cent. |
|---|---|---|
| Agriculture and horticulture, | 34 | 20.00 |
| Artisans, | 45 | 26.47 |
| Business, | 41 | 24.12 |
| Deceased, or no statistics, | 13 | 7.65 |
| Miscellaneous, | 11 | 6.47 |
| Professional, | 23 | 13.53 |
| Retired, | 3 | 1.77 |
| | 170 | 100.01 |

### *H. Intended Vocation of Student.*

| | Number. | Per Cent. |
|---|---|---|
| Agriculture or horticulture (practical), | 62 | 36.47 |
| Agriculture or horticulture (professional), | 70 | 41.18 |
| Miscellaneous, | – | – |
| Professions, | 4 | 2.35 |
| Undecided or no statistics, | 34 | 20.00 |
| | 170 | 100.00 |

## Table VII. — *Statistics of Freshmen, etc.* — Concluded.

### *I. Farm Experience.*

| | Number. | Per Cent. |
|---|---|---|
| Brought up on a farm, | 53 | 31.18 |
| Not brought up on a farm and having had no or practically no farm experience. | 51 | 30.00 |
| Not brought up on a farm but having had some farm experience. | 66 | 38.82 |
| | 170 | 100.00 |

### *J. Miscellaneous Statistics.*

| | |
|---|---|
| Average age, | 19.16 years. |
| Number signifying their intention to seek student labor, | 94 (55.30 per cent.) |
| Number boarding at the college dining hall, | 117 (68.82 per cent.) |

## Table VIII. — *Entrance Statistics of Freshman Class.*

| | | | |
|---|---|---|---|
| Number of applications (preliminary applications number 54), | | | 352 |
| Admitted, | | 202 | |
| Matriculated, | 170 | | |
| Failed to report, | 32 | | |
| Rejected, | | 150 | |
| Total, | | | 352 |
| Matriculated on certificate, | | | 74 |
| Matriculated on examination, | | | 14 |
| Matriculated on certificate and examination, | | | 69 |
| Matriculated on credentials from another college, | | | 5 |
| Re-entered, | | | 8 |
| | | | 170 |
| Matriculated without condition, | | | 108 |
| Matriculated with condition, | | | 62 |
| | | | 170 |

## Table IX. — *Cases treated at the Infirmary, Dec. 1, 1915, to Nov. 30, 1916.*

| | Daily Count. | Individual Count. |
|---|---|---|
| December 1, 1915, to January 1, 1916: — | | |
| House cases, | 62 | 15 |
| Out-patients, | 26 | 25 |
| January 1 to February 1: — | | |
| House cases, | 82 | 17 |
| Out-patients, | 50 | 28 |
| February 1 to March 1: — | | |
| House cases, | 52 | 12 |
| Out-patients, | 38 | 17 |

TABLE IX. — *Cases treated at the Infirmary, Dec. 1, 1915, to Nov. 30, 1916* — Concluded.

| | Daily Count. | Individual Count. |
|---|---|---|
| March 1 to April 1: — | | |
| House cases, | 10 | 4 |
| Out-patients, | 71 | 24 |
| April 1 to May 1: — | | |
| House cases, | 6 | 2 |
| Out-patients, | 85 | 27 |
| May 1 to June 1: — | | |
| House cases, | 26 | 10 |
| Out-patients, | 63 | 33 |
| June 1 to June 19: — | | |
| House cases, | 29 | 8 |
| Out-patients, | 23 | 15 |
| September 16 to October 1: — | | |
| House cases, | – | – |
| Out-patients, | 13 | 13 |
| October 1 to November 1: — | | |
| House cases, | 22 | 7 |
| Out-patients, | 129 | 63 |
| November 1 to December 1: — | | |
| House cases, | 35 | 9 |
| Out-patients, | 70 | 29 |

| | |
|---|---|
| Number of house cases, | 324 |
| Number of out-patients, | 568 |
| Total, | 892 |
| Number cared for in the house, | 84 |
| Number cared for as out-patients, | 274 |
| Total, | 358 |

# REPORT OF THE TREASURER

## FOR THE FISCAL YEAR ENDING NOV. 30, 1916.

### BALANCE SHEET.

| | | Dr. | Cr. |
|---|---|---|---|
| 1915. | | | |
| Dec. 1. | To balance on hand, | $53,139 07 | |
| 1916. | | | |
| Nov. 30. | To receipts for fiscal year, | 657,679 74 | |
| | Expenditures for fiscal year, | | $668,964 27 |
| | Balance on hand, | | 41,854 54 |
| | | $710,818 81 | $710,818 81 |

### SCHEDULE A. — INCOME.

| | | Items. | Totals. |
|---|---|---|---|
| Income from students and others, | | . . . | $94,075 29 |
| Tuition, | | $3,200 00 | |
| Laboratory fees, | | 5,718 75 | |
| Rents, | | 5,521 51 | |
| Department sales, | | 48,190 34 | |
| Department transfers, | | 20,095 43 | |
| Miscellaneous, | | 11,349 26 | |
| Income from grants by nation and State: — | | | |
| State aid, | | . . . | 441,756 50 |
| Income from endowment, | | $3,313 32 | |
| Appropriation for current expenses, | . . . | 245,000 00 | |
| Administration, | $32,000 00 | | |
| Maintenance, | 105,000 00 | | |
| Instruction, | 100,000 00 | | |
| Graduate School, | 3,000 00 | | |
| Additional land, | 5,000 00 | | |
| Appropriation for extension service, | | 50,000 00 | |
| Appropriation for experiment station, | . . . | 36,000 00 | |
| Maintenance, | $30,000 00 | | |
| Feed law, | 6,000 00 | | |
| Receipts from special appropriation, | | 107,443 18 | |
| Federal aid, | | . . . | 84,785 23 |
| Income from land grant of 1862, | | $7,300 00 | |
| Income from Hatch fund of 1887, | | 15,000 00 | |
| Income from Adams fund of 1906, | | 15,000 00 | |
| Income from Morrill fund of 1890, | | 16,666 66 | |
| Income from Nelson fund of 1907, | | 16,666 67 | |
| Income from Smith-Lever fund of 1914, | | 14,151 90 | |
| Income from other sources: — | | | |
| Income from experiment station, | | . . . | 31,400 70 |
| Fertilizer receipts, | | $9,400 00 | |
| Agricultural receipts, | | 5,080 69 | |
| Cranberry receipts, | | 2,771 12 | |
| Chemical receipts, | | 12,002 98 | |
| Miscellaneous receipts, | | 2,145 91 | |

## SCHEDULE A. — INCOME — *Concluded.*

| | Items. | Totals. |
|---|---|---|
| Income from other sources — *concluded.* | | |
| Income from extension service, | | $5,662 02 |
| Winter school, | $979 90 | |
| Summer school, | 1,825 88 | |
| Correspondence courses receipts, | 696 96 | |
| Exhibits, | 525 00 | |
| Civic improvements, | 986 11 | |
| Miscellaneous receipts, | 648 17 | |
| Total, | $657,679 74 | $657,679 74 |

## Classification of Income from Students and Others.

| | Laboratory Fees. | Department Sales. | Transfers. | Rent. | Miscellaneous. | Tuition. | Totals. |
|---|---|---|---|---|---|---|---|
| Agricultural economics, | - | - | - | - | $21 00 | - | $21 00 |
| Agricultural education, | - | - | - | - | 70 00 | - | 70 00 |
| Agronomy, | $137 75 | - | - | - | - | - | 137 75 |
| Animal husbandry, | 280 50 | $0 38 | - | - | - | - | 280 88 |
| Beekeeping, | - | 288 05 | - | - | - | - | 288 05 |
| Botany, | 1,073 50 | 50 45 | - | - | - | - | 1,123 95 |
| Chemistry, | 2,506 75 | 44 41 | - | - | - | - | 2,551 16 |
| Dairy, | 101 00 | 11,131 41 | $9,445 76 | - | - | - | 20,678 17 |
| Entomology, | 78 00 | 13 26 | - | - | - | - | 91 26 |
| Farm administration, | - | 1 50 | 100 55 | - | - | - | 102 05 |
| Floriculture, | 55 75 | 3,433 04 | 19 14 | - | 9 12 | - | 3,517 05 |
| Farm, | - | 28,146 91 | 840 02 | - | - | - | 28,986 93 |
| Forestry, | 10 50 | - | - | - | - | - | 10 50 |
| General agriculture, | - | - | 24 09 | - | 100 55 | - | 124 64 |
| General horticulture, | - | 2 50 | 3,827 67 | - | 237 12 | - | 4,067 29 |
| Graduate school, | - | 2 00 | - | - | - | - | 2 00 |
| Grounds, | - | - | - | - | 25 32 | - | 25 32 |
| Hospital, | - | - | - | - | 25 73 | - | 25 73 |
| Improvements, 1916, | - | - | - | - | 670 06 | - | 670 06 |
| Landscape gardening, | 242 00 | 12 92 | - | - | - | - | 254 92 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Language and literature, | 46 25 | - | - | - | - | - | 46 25 |
| Library, | - | 540 46 | - | - | - | - | 540 46 |
| Market gardening, | 18 50 | 1,730 37 | 396 07 | - | - | - | 2,144 94 |
| Mathematics, | 65 00 | - | - | - | - | - | 65 00 |
| Microbiology, | 331 25 | - | - | - | 115 68 | - | 446 93 |
| Miscellaneous, | - | - | - | - | 2,881 15 | - | 2,881 15 |
| Military, | - | - | - | - | 44 23 | - | 44 23 |
| Physics, | 6 00 | - | - | - | 8 96 | - | 14 96 |
| Pomology, | 100 50 | 1,336 31 | 215 24 | - | - | - | 1,652 05 |
| Physical education, | - | - | - | - | 98 50 | - | 98 50 |
| Poultry husbandry, | 105 50 | 1,329 64 | 4,926 89 | - | 108 38 | - | 6,470 41 |
| Rural engineering, | 111 00 | 104 23 | - | - | - | - | 215 23 |
| Rural sociology, | - | - | - | - | 1 59 | - | 1 59 |
| Veterinary, | - | 22 32 | - | - | - | - | 22 32 |
| Zoölogy and geology, | 449 00 | 18 | - | - | - | - | 449 18 |
| Operating and maintenance, | - | - | 300 00 | - | 6,893 99 | $3,200 00 | 10,393 99 |
| North dormitory, | - | - | - | $1,853 00 | - | - | 1,853 00 |
| South dormitory, | - | - | - | 2,171 80 | - | - | 2,171 80 |
| College residences, | - | - | - | 659 30 | - | - | 659 30 |
| Executive order, | - | - | - | - | 37 88 | - | 37 88 |
| Draper hall, | - | - | - | 837 41 | - | - | 837 41 |
| Totals, | $5,718 75 | $48,190 34 | $20,095 43 | $5,521 51 | $11,349 26 | $3,200 00 | $94,075 29 |

## SCHEDULE B. — EXPENDITURES FOR FISCAL YEAR.

| | Items. | Totals. |
|---|---|---|
| College expenses, | | $394,683 19 |
| Administration, | $34,729 71 | |
| Maintenance, | 215,409 87 | |
| Instruction, | 144,543 61 | |
| Experiment station, | | 96,954 59 |
| Administration, | $1,029 25 | |
| Feed inspection, | 5,632 53 | |
| Fertilizer law, | 11,434 88 | |
| Salaries, | 42,986 41 | |
| Department, | 35,871 52 | |
| Extension service, | | 69,883 31 |
| Salaries, | $38,546 56 | |
| Travel, | 10,291 70 | |
| Departments, | 21,045 05 | |
| Special appropriation, | | 107,443 18 |
| 1914, agriculture building, | $16,109 87 | |
| Microbiology building, | 47,935 38 | |
| Improvements and equipment, | 17,336 77 | |
| 1916, agriculture building, | 12,243 49 | |
| Retaining wall and platform, | 4,200 00 | |
| Rural engineering shop, | 9,617 67 | |
| Total, | | $668,964 27 |

## ANALYSIS OF COLLEGE EXPENDITURES.

| ADMINISTRATION. | Office Expense. | Salaries and Labor. | Travel. | Minor Equipment. | Building Supplies. | Publicity and Lectures. | Student Activity. | Commencement. | Miscellaneous. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|
| Dean's office, | $241 00 | $280 06 | - | $8 72 | - | - | - | - | - | $529 78 |
| Executive order, | - | - | $2,335 99 | - | - | $1,474 64 | $1,092 68 | $537 30 | $2,981 16 | 8,421 77 |
| President's office, | 756 77 | 124 63 | 128 83 | - | $8 06 | - | - | - | 89 22 | 1,107 51 |
| Registrar's office, | 435 67 | 100 54 | 42 71 | - | - | - | - | - | - | 578 92 |
| Treasurer's office, | 365 32 | 309 64 | 143 84 | 101 51 | 7 68 | - | - | - | 142 77 | 1,070 76 |
| Administration (salaries), | - | 23,020 97 | - | - | - | - | - | - | - | 23,020 97 |
| Totals, | $1,798 76 | $23,835 84 | $2,651 37 | $110 23 | $15 74 | $1,474 64 | $1,092 68 | $537 30 | $3,213 15 | $34,729 71 |

| MAINTENANCE. | Office Supplies. | Labor. | Laboratory Supplies. | Refunds. | Minor Equipment. | Building Supplies. | Travel. | General Expense. | Miscellaneous. | Salaries. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Academic maintenance: — | | | | | | | | | | | |
| Agriculture, | - | $1,151 76 | - | - | $194 60 | $240 20 | - | - | $23 58 | - | $1,610 14 |
| Agricultural economics, | $143 97 | 9 63 | $50 52 | - | 15 79 | - | $8 37 | - | - | - | 228 28 |
| Agricultural education, | 213 57 | 56 77 | 75 47 | - | 55 20 | - | 30 61 | - | 61 65 | - | 493 27 |
| Agronomy, | 68 51 | 204 43 | 269 24 | $74 65 | 64 11 | - | 57 75 | - | - | - | 738 69 |
| Animal husbandry, | 90 93 | 109 10 | 59 82 | 10 50 | 8 96 | - | 119 20 | - | - | - | 398 51 |
| Beekeeping, | 115 75 | 1,058 19 | 131 45 | - | 238 09 | 121 17 | 17 71 | - | - | - | 1,682 36 |
| Botany, | 149 29 | 627 97 | 599 51 | 48 50 | 26 62 | 12 75 | 25 42 | - | - | - | 1,490 06 |
| Chemistry, | 184 47 | 1,138 23 | 2,938 26 | 681 07 | 16 64 | 55 37 | 5 74 | - | - | - | 5,019 78 |
| Dairying, | 150 09 | 2,538 85 | 21,052 70 | 8 94 | 921 28 | 71 44 | 101 94 | - | - | - | 24,845 24 |
| Economics and sociology, | 22 97 | 15 | 6 42 | - | 8 07 | - | 2 00 | - | - | - | 39 61 |
| Entomology, | 47 21 | 301 70 | 147 99 | 2 50 | 45 69 | 67 28 | 3 38 | - | - | - | 615 75 |
| Farm administration, | 126 05 | 25 93 | 56 28 | - | 49 60 | - | 36 43 | - | 100 55 | - | 394 84 |
| Floriculture, | 132 84 | 4,483 56 | 1,392 49 | 1 50 | 96 56 | 72 82 | 140 78 | - | - | - | 6,320 55 |
| Forestry, | 24 38 | 75 26 | 53 46 | - | 85 40 | - | 75 98 | - | - | - | 314 48 |
| History and government, | 1 40 | - | - | - | - | - | - | - | - | - | 1 40 |

### ANALYSIS OF COLLEGE EXPENDITURES — *Concluded.*

| MAINTENANCE. | Office Supplies. | Labor. | Laboratory Supplies. | Refunds. | Minor Equipment. | Building Supplies. | Travel. | General Expense. | Miscellaneous. | Salaries. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hospital, | - | $943 76 | - | - | $65 00 | - | - | $200 30 | - | - | $1,209 06 |
| Landscape gardening, | $12 73 | 8 02 | $268 24 | $26 35 | 62 23 | - | $11 37 | - | - | - | 388 94 |
| Language and literature, | 24 96 | 133 11 | 91 87 | 16 32 | 102 60 | - | - | - | - | - | 368 86 |
| Market gardening, | 71 09 | 2,504 47 | 800 26 | 2 00 | 81 21 | $3 06 | 158 26 | - | - | - | 3,620 35 |
| Mathematics, | 59 75 | 78 95 | 34 85 | 5 00 | - | 25 82 | - | - | - | - | 204 37 |
| Microbiology, | 94 95 | 254 78 | 375 11 | 137 64 | 105 65 | 41 91 | 3 95 | - | $163 82 | - | 1,177 81 |
| Military science, | 157 47 | 892 82 | 2 67 | - | 275 16 | 10 04 | 7 50 | - | 252 92 | - | 1,598 58 |
| Physical education, | 155 91 | 135 30 | 292 58 | - | 80 14 | 32 62 | 324 41 | - | - | - | 1,020 96 |
| Physics, | 62 80 | 333 75 | 111 90 | 5 00 | 127 71 | 15 47 | 3 17 | - | - | - | 659 80 |
| Pomology, | 92 05 | 2,416 62 | 816 40 | 50 | 36 14 | 11 59 | 38 49 | - | - | - | 3,411 79 |
| Poultry husbandry, | 535 85 | 2,397 29 | 5,938 33 | 1 50 | 336 98 | 154 31 | 39 15 | - | - | - | 9,403 41 |
| Rural engineering, | 19 71 | 141 16 | 289 73 | 10 00 | 121 63 | - | 77 84 | - | - | - | 660 07 |
| Rural sociology, | 69 40 | 28 19 | 20 | - | 2 46 | - | 29 74 | - | - | - | 129 99 |
| Veterinary science, | 55 00 | 302 15 | 796 59 | - | 1 70 | 161 09 | 23 07 | - | - | - | 1,339 60 |
| Zoölogy and geology, | 29 71 | 182 75 | 209 01 | 27 50 | 55 89 | - | 50 31 | - | - | - | 555 17 |
| General maintenance: — | | | | | | | | | | | |
| Equipment, 1916, | - | - | - | - | - | - | - | 1,789 65 | - | - | 1,789 65 |
| Farm, | - | - | - | - | - | - | - | 35,143 56 | - | - | 35,143 56 |
| General horticulture, | - | - | - | - | - | - | - | 8,586 92 | - | - | 8,586 92 |
| Graduate school, | - | - | - | - | - | - | - | 134 61 | - | - | 134 61 |
| Grounds, | - | - | - | - | - | - | - | 5,092 93 | - | - | 5,092 93 |
| Land, | - | - | - | - | - | - | - | 8,350 00 | - | - | 8,350 00 |
| Library, | - | - | - | - | - | - | - | 7,269 08 | - | - | 7,269 08 |
| Miscellaneous, | - | - | - | - | - | - | - | 5,434 41 | - | - | 5,434 41 |
| Operating and maintenance, | - | - | - | - | - | - | - | 71,665 52 | - | - | 71,665 52 |
| Improvement, 1916, | - | - | - | - | - | - | - | 2,001 47 | - | - | 2,001 47 |
| Totals, | $2,912 81 | $22,534 65 | $36,861 35 | $1,059 47 | $3,281 11 | $1,096 94 | $1,392 57 | $145,668 45 | $602 52 | - | $215,409 87 |
| Instruction (salaries), | - | - | - | - | - | - | - | - | - | $144,543 61 | 144,543 61 |
| Grand total, | - | - | - | - | - | - | - | - | - | - | $394,683 19 |

## CURRENT ACCOUNTS.

### *Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Nov. 30, 1915, to Nov. 30, 1916. | Receipts from Nov. 30, 1915, to Nov. 30, 1916. | Apportionment for Year ending Nov. 30, 1916. | Balance to Credit. |
|---|---|---|---|---|
| Administration: — | | | | |
| Dean's office, | $529 78 | - | $500 00 | —$29 78 |
| Executive order, | 8,421 77 | $37 88 | 9,500 00 | 1,116 11 |
| President's office, | 1,107 51 | - | 1,000 00 | —107 51 |
| Registrar's office, | 578 92 | - | 600 00 | 21 08 |
| Salaries, | 23,020 97 | - | 22,000 00 | —1,020 97 |
| Treasurer's office, | 1,070 76 | - | 1,400 00 | 329 24 |
| State Treasurer, | - | 35,000 00 | - | - |
| Maintenance academic: — | | | | |
| Agriculture, | 1,610 14 | 124 64 | 1,400 00 | —85 50 |
| Agricultural economics, | 228 28 | 21 00 | 200 00 | —7 28 |
| Agricultural education, | 493 27 | 70 00 | 460 00 | 36 73 |
| Agronomy, | 738 69 | 137 75 | 550 00 | —50 94 |
| Animal husbandry, | 398 51 | 280 88 | 420 00 | 302 37 |
| Beekeeping, | 1,682 36 | 288 05 | 1,500 00 | 105 69 |
| Botany, | 1,490 06 | 1,123 95 | 825 00 | 458 89 |
| Chemistry, | 5,019 78 | 2,551 16 | 2,000 00 | —468 62 |
| Dairying, | 24,845 24 | 20,678 17 | 4,400 00 | 232 93 |
| Economics and sociology, | 39 61 | - | 50 00 | 10 39 |
| Entomology, | 615 75 | 91 26 | 720 00 | 195 51 |
| Farm administration, | 394 84 | 102 05 | 400 00 | 107 21 |
| Floriculture, | 6,320 55 | 3,517 05 | 2,900 00 | 96 50 |
| Forestry, | 314 48 | 10 50 | 375 00 | 71 02 |
| History and government, | 1 40 | - | 25 00 | 23 60 |
| Hospital, | 1,209 06 | 25 73 | 1,500 00 | 316 67 |
| Landscape gardening, | 388 94 | 254 92 | - | - |
| Language and literature, | 368 86 | 46 25 | 373 50 | 50 89 |
| Market gardening, | 3,620 35 | 2,144 94 | 2,300 00 | 824 59 |
| Mathematics, | 204 37 | 65 00 | 250 00 | 110 63 |
| Microbiology, | 1,177 81 | 446 93 | 1,125 00 | 394 12 |
| Military science, | 1,598 58 | 44 23 | 1,500 00 | —54 35 |
| Physical education, | 1,020 96 | 98 50 | 700 00 | —222 46 |
| Physics, | 659 80 | 14 96 | 600 00 | —44 84 |
| Pomology, | 3,411 79 | 1,652 05 | 1,875 00 | 115 26 |
| Poultry husbandry, | 9,403 41 | 6,470 41 | 3,300 00 | 367 00 |
| Rural engineering, | 660 07 | 215 23 | 450 00 | 5 16 |
| Rural sociology, | 129 99 | 1 59 | 200 00 | 71 60 |
| Veterinary science, | 1,339 60 | 22 32 | 1,300 00 | —17 28 |
| Zoölogy and geology, | 555 17 | 449 18 | 350 00 | 244 01 |
| Maintenance general: — | | | | |
| Equipment, 1916, | 1,789 65 | - | - | - |
| Farm, | 35,143 56 | 28,986 93 | 3,000 00 | —3,156 63 |
| General horticulture, | 8,586 92 | 4,067 29 | 3,500 00 | —1,019 62 |
| Graduate school, | 134 61 | 2 00 | 200 00 | 67 39 |
| Grounds, | 5,092 93 | 25 32 | 5,500 00 | 432 39 |
| Improvements, 1916, | 2,001 47 | 670 06 | - | - |
| Library, | 7,269 08 | 540 46 | 6,600 00 | —128 62 |
| Miscellaneous, | 5,434 41 | 2,881 15 | - | - |
| Operating and maintenance, | 71,665 52 | 15,915 50 | 56,000 00 | 249 98 |
| State Treasurer, maintenance, | - | 107,000 00 | - | - |
| Land, | 8,350 00 | - | 10,000 00 | 1,650 00 |
| Endowment fund, | - | 10,613 32 | - | - |
| Instruction: — | | | | |
| Salaries, | 144,543 61 | - | - | - |
| United States Treasurer: — | | | | |
| Morrill fund, | - | 16,666 67 | - | - |
| Nelson fund, | - | 16,666 66 | - | - |
| State Treasurer: — | | | | |
| Instruction, | - | 100,000 00 | - | - |
| Graduate school, | - | 3,000 00 | - | - |
| Totals, | $394,683 19 | $383,021 94 | $151,848 50 | - |
| Balance beginning fiscal year Dec. 1, 1915, | - | 31,357 66 | - | - |
| Balance on hand Nov. 30, 1916, | 19,696 41 | - | - | - |
| Totals, | $414,379 60 | $414,379 60 | - | - |

## COLLEGE ACCOUNTS.

*Comparative Disbursements and Receipts for 1915–16.*

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | 1915. | 1916. | 1915. | 1916. |
| Agricultural economics, | $164 45 | $228 28 | $17 25 | $21 00 |
| Agricultural education, | 508 11 | 493 27 | 96 | 70 00 |
| Agronomy, | 445 80 | 738 69 | 511 00 | 137 75 |
| Animal husbandry, | 543 75 | 398 51 | 280 00 | 280 88 |
| Beekeeping, | 1,597 29 | 1,682 36 | 103 79 | 288 05 |
| Botany, | 1,386 06 | 1,490 06 | 674 48 | 1,123 95 |
| Chemistry, | 4,661 05 | 5,019 78 | 2,961 28 | 2,551 16 |
| Dairying, | 21,917 41 | 24,845 24 | 18,696 58 | 20,678 17 |
| Dean's office, | 486 04 | 529 78 | – | – |
| Economics and sociology, | 36 40 | 39 61 | – | – |
| Entomology, | 732 70 | 615 75 | 114 06 | 91 26 |
| Equipment, | 7,737 96 | 1,789 65 | – | – |
| Executive order, | 7,915 34 | 8,421 77 | 48 85 | 37 88 |
| Farm administration, | 585 11 | 394 84 | 28 38 | 102 05 |
| Farm, | 31,441 99 | 35,143 56 | 31,985 41[1] | 28,986 93 |
| Floriculture, | 4,669 08 | 6,320 55 | 3,087 20 | 3,517 05 |
| Forestry, | 327 72 | 314 48 | 167 40 | 10 50 |
| General agriculture, | – | 1,610 14 | – | 124 64 |
| General horticulture, | 7,234 72 | 8,586 92 | 3,819 30 | 4,067 29 |
| Graduate school, | 82 26 | 134 61 | – | 2 00 |
| Grounds, | 3,616 53 | 5,092 93 | 507 70 | 25 32 |
| History and government, | 5 27 | 1 40 | – | – |
| Hospital, | 741 11 | 1,209 06 | 30 77 | 25 73 |
| Improvements, | 7,455 01 | 2,001 47 | – | 670 06 |
| Land, | – | 8,350 00 | – | – |
| Landscape gardening, | 446 35 | 388 94 | 416 04 | 254 92 |
| Language and literature, | 169 80 | 368 86 | 40 | 46 25 |
| Library, | 6,804 27 | 7,269 08 | 607 71 | 540 46 |
| Market gardening, | 3,644 91 | 3,620 35 | 1,487 65 | 2,144 94 |
| Mathematics, | 263 66 | 204 37 | 90 00 | 65 00 |
| Military, | 1,310 48 | 1,598 58 | 5 90 | 44 23 |
| Microbiology, | 691 26 | 1,177 81 | 450 16 | 446 93 |
| Miscellaneous, | – | 5,434 41 | – | 2,881 15 |
| Physical education, | 922 69 | 1,020 96 | 1 25 | 98 50 |
| Physics, | 586 38 | 659 80 | 93 | 14 96 |
| Pomology, | 3,472 54 | 3,411 79 | 1,805 72 | 1,652 05 |
| Poultry husbandry, | 6,405 28 | 9,403 41 | 3,570 90 | 6,470 41 |
| President's office, | 937 99 | 1,107 51 | 55 | – |
| Registrar's office, | 514 28 | 578 92 | – | – |
| Rural engineering, | 461 98 | 660 07 | 106 56 | 215 23 |
| Rural sociology, | 94 00 | 129 99 | 1 40 | 1 59 |
| Salaries, | 151,671 88 | 167,564 58 | 373 34 | – |
| Treasurer's office, | 1,419 46 | 1,070 76 | – | – |
| Veterinary, | 1,235 66 | 1,339 60 | 27 13 | 22 32 |
| Zoölogy and geology, | 774 76 | 555 17 | 414 75 | 449 18 |
| Operating and maintenance, | 56,541 14 | 71,665 52 | 13,603 71 | 15,915 50 |
| State Treasurer: — | | | | |
| Endowment fund, | – | – | 10,613 32 | 10,613 32 |
| Graduate school, | – | – | 2,000 00 | 3,000 00 |
| Maintenance, | – | – | 105,000 00 | 107,000 00 |
| Instruction, | – | – | 90,000 00 | 100,000 00 |
| Administration, | – | – | 31,000 00 | 35,000 00 |
| United States Treasurer: — | | | | |
| Morrill fund, | – | – | 16,666 66 | 16,666 66 |
| Nelson fund, | – | – | 16,666 67 | 16,666 67 |
| Totals, | $342,659 93 | $394,683 19 | $357,945 16 | $383,021 94 |
| Balance beginning fiscal year, | – | – | 16,072 43 | 31,357 66 |
| Balance on hand at close of fiscal year, | 31,357 66 | 19,696 41 | – | – |
| Totals, | $374,017 59 | $414,379 60 | $374,017 59 | $414,379 60 |

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[1] This large amount of receipts is due to the sale of milk the last three months of 1914, paid in 1915.

## College Accounts — *Concluded.*

### *Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| Cash on hand Dec. 1, 1915, | | $31,357 66 |
| Institution receipts Nov. 30, 1916, | | 94,075 29 |
| State Treasurer's receipts Nov. 30, 1916, | | 255,613 32 |
| United States Treasurer's receipts Nov. 30, 1916, | | 33,333 33 |
| Total disbursements, | $394,683 19 | - |
| | $394,683 19 | $414,379 60 |
| Bills receivable Dec. 1, 1915, deducted, | | 5,669 36 |
| Bills payable Dec. 1, 1916, deducted, | 2,742 27 | |
| | $391,940 92 | $408,710 24 |
| Bills receivable Nov. 30, 1916, | - | 8,077 39 |
| Bills payable Nov. 30, 1916, | 6,250 83 | - |
| Balance, | 18,595 88 | - |
| | $416,787 63 | $416,787 63 |

## FARM DISBURSEMENTS.

| | Labor. | Equipment. | Feed. | Fertilizer. | Seeds. | Stock. | Supplies. | Improvements. | Totals. |
|---|---|---|---|---|---|---|---|---|---|
| Cattle, | $5,850 00 | - | $6,203 77 | - | - | - | $399 65 | - | $12,453 42 |
| Dairy, | 2,119 27 | $114 04 | - | - | - | - | 2,577 05 | - | 4,810 36 |
| Horses, | 2,279 03 | - | 1,383 83 | - | - | $325 20 | 381 25 | - | 4,369 31 |
| Sheep, | 203 97 | - | 136 45 | - | - | - | 65 40 | - | 405 82 |
| Swine, | 608 58 | - | 1,436 29 | - | - | - | 79 43 | - | 2,124 30 |
| Field crops, | 3,712 13 | - | - | $1,143 09 | $431 96 | - | 121 56 | - | 5,408 74 |
| Miscellaneous, | 2,269 77 | - | - | - | - | - | 125 67 | $1,612 16 | 4,007 60 |
| Tools and machinery, | - | - | - | - | - | - | 393 64 | - | 393 64 |
| Live stock, | - | - | - | - | - | - | 1,170 37 | - | 1,170 37 |
| Totals, | $17,042 75 | $114 04 | $9,160 34 | $1,143 09 | $431 96 | $325 20 | $5,314 02 | $1,612 16 | $35,143 56 |

## FARM CREDITS.

| | Milk. | Stock. | Sundry. | Hay. | Roots. | Labor. | Potatoes. | Totals. |
|---|---|---|---|---|---|---|---|---|
| Cattle, | - | $1,728 50 | $180 53 | - | - | - | - | $1,909 03 |
| Dairy, | $21,207 85 | - | - | - | - | - | - | 21,207 85 |
| Horses, | - | 135 00 | 719 34 | - | - | - | - | 854 34 |
| Sheep, | - | 126 00 | 84 50 | - | - | - | - | 210 50 |
| Swine, | - | 1,856 85 | 2 00 | - | - | - | - | 1,858 85 |
| Field crops, | - | - | - | $602 94 | $463 15 | - | $525 95 | 1,592 04 |
| Miscellaneous, | - | - | 367 75 | - | - | $986 57 | - | 1,354 32 |
| Totals, | $21,207 85 | $3,846 35 | $1,354 12 | $602 94 | $463 15 | $986 57 | $525 95 | $28,986 93 |

## AGRICULTURAL DIVISION.

### *Disbursements and Receipts.*

| | Disbursements. | Receipts. |
|---|---|---|
| Agronomy, | $738 69 | $137 75 |
| Animal husbandry, | 398 51 | 280 88 |
| Dairying, | 24,845 24 | 20,678 17 |
| Farm, | 35,143 56 | 28,986 93 |
| Farm administration, | 394 84 | 102 05 |
| Poultry husbandry, | 9,403 41 | 6,470 41 |
| Rural engineering, | 660 07 | 215 23 |
| Division totals, | $71,584 32 | $56,871 42 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | | $56,871 42 |
| By bills receivable, | | 4,823 32 |
| By net apportionment, | | 12,520 00 |
| To total disbursements, | $71,584 32 | |
| To bills payable, | 3,118 60 | |
| Balance, | | 488 18 |
| | $74,702 92 | $74,702 92 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1915. | Nov. 30, 1916. |
|---|---|---|
| Inventory of produce, | $11,518 42 | $8,533 40 |
| Inventory of cattle, | 14,945 00 | 14,200 00 |
| Inventory of swine, | 900 00 | 1,505 00 |
| Inventory of horses, | 5,425 00 | 6,765 00 |
| Inventory of poultry, | 1,162 25 | 2,277 00 |
| Inventory of sheep, | 591 00 | 668 00 |
| | $34,541 67 | $33,948 40 |

## HORTICULTURAL DIVISION.

### *Disbursements and Receipts.*

| | Disbursements. | Receipts. |
|---|---|---|
| Floriculture, | $6,320 55 | $3,517 05 |
| Forestry, | 314 48 | 10 50 |
| General horticulture, | 8,586 92 | 4,067 29 |
| Grounds, | 5,092 93 | 25 32 |
| Landscape gardening, | 388 94 | 254 92 |
| Market gardening, | 3,620 35 | 2,144 94 |
| Pomology, | 3,411 79 | 1,652 05 |
| Division totals, | $27,735 96 | $11,672 07 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | | $11,672 07 |
| By bills receivable, | | 1,232 85 |
| By apportionment, | | 16,450 00 |
| To total division disbursements, | $27,735 96 | |
| To bills payable, | 535 69 | |
| By balance, | 1,083 27 | |
| | $29,354 92 | $29,354 92 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1915. | Nov. 30, 1916. |
|---|---|---|
| Floriculture, | $550 00 | $500 00 |
| Market gardening, | 121 50 | 150 00 |
| Pomology, | 375 00 | 575 00 |
| General horticulture (live stock), | 1,695 00 | 1,750 50 |
| | $2,741 50 | $2,975 50 |

## Expense Operating and Maintenance.

| | Salaries. | Labor. | Fuel and Water. | Repairs. | Supplies. | Tools. | Architect. | Engineer. | Miscellaneous. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|
| General: — | | | | | | | | | | |
| General superintendent, | $3,201 73 | – | – | – | – | – | – | – | – | $3,201 73 |
| Office, | – | $1,075 65 | – | – | – | – | – | – | – | 1,075 65 |
| General expense, | – | – | – | – | $3,288 75 | – | – | – | – | 3,288 75 |
| Power plant: — | | | | | | | | | | |
| Heat, | – | 6,152 89 | $30,806 05 | $1,177 24 | $104 94 | – | – | – | – | 38,241 12 |
| Light, | – | 526 61 | 16 79 | 279 33 | 69 41 | – | – | – | – | 892 14 |
| Tools, | – | – | – | – | - | $1,129 61 | - | – | – | 1,129 61 |
| Gas mains, | – | 5 72 | – | – | – | – | – | – | – | 5 72 |
| Amherst Water Company, | – | – | 2,187 36 | – | – | – | – | – | – | 2,187 36 |
| Night watchman, | – | 1,344 05 | – | – | – | – | – | – | – | 1,344 05 |
| Mail service | – | 246 31 | – | – | – | – | – | – | – | 246 31 |
| Water mains, | – | 101 23 | – | – | – | – | – | – | – | 101 23 |
| Steam mains, | – | 949 89 | – | – | – | – | – | – | – | 949 89 |
| Electric light circuit, | – | 304 91 | – | – | – | - | – | – | – | 304 91 |
| Waiting station janitor, | – | 5 90 | – | – | – | – | – | – | – | 5 90 |
| Miscellaneous sundry, | – | – | – | – | – | – | – | – | $5,963 46 | 5,963 46 |
| Sewers and cesspools, | – | 31 80 | – | – | – | – | – | – | – | 31 80 |
| Walks, | – | 75 37 | – | – | – | – | – | – | – | 75 37 |
| Emergency maintenance, | – | 1,531 31 | – | – | – | – | – | – | – | 1,531 31 |
| Expert services, | – | – | – | – | – | – | $1,098 17 | $49 15 | – | 1,147 32 |
| Fire department, | 660 00 | 77 92 | – | – | 29 71 | – | – | – | 1 75 | 769 38 |
| Amherst Gas Company, | – | – | 55 52 | – | – | – | – | – | – | 55 52 |
| Totals, | $3,861 73 | $12,429 56 | $33,065 72 | $1,456 57 | $3,492 81 | $1,129 61 | $1,098 17 | $49 15 | $5,965 21 | $62,548 53 |

### EXPENSE OPERATING AND MAINTENANCE — *Concluded.*

| COLLEGE BUILDINGS. | Electric Repairs. | Plumbing Repairs. | Heat Repairs. | C. and M. Repairs. | Janitor. | Bell Ringing. | Sundry. | Totals. |
|---|---|---|---|---|---|---|---|---|
| College buildings: — | | | | | | | | |
| Animal husbandry building, | $1 07 | $2 33 | $5 87 | $1 07 | - | - | - | $10 34 |
| Horse barn, | 5 37 | 2 40 | 28 | 120 67 | - | - | - | 128 72 |
| Dairy barn, | 8 97 | 44 66 | 69 17 | 31 99 | - | - | - | 154 79 |
| Young stock barn, | - | 38 | - | 8 25 | - | - | - | 8 63 |
| Power building, | 6 34 | 47 55 | - | 134 69 | $248 65 | - | - | 437 23 |
| Chemical building, | 1 91 | 62 00 | 12 28 | 63 49 | - | - | - | 139 68 |
| Poultry building, | 6 89 | 23 58 | 4 21 | 20 78 | - | - | - | 55 46 |
| Dairy building, | 41 44 | 65 89 | 44 25 | 306 95 | - | - | - | 458 53 |
| Drill hall, | 5 73 | 36 44 | 24 88 | 157 60 | - | - | - | 224 65 |
| Veterinary building, | 2 28 | 9 00 | 91 | 73 32 | - | - | - | 85 51 |
| Apiary building, | 2 80 | 10 49 | 2 18 | 45 78 | - | - | - | 61 25 |
| Mathematic building, | - | 86 | 42 32 | 15 12 | - | - | - | 58 30 |
| Entomology building, | 23 33 | 64 92 | 18 84 | 229 81 | - | - | - | 336 90 |
| Clark hall, | 13 93 | 68 65 | 23 71 | 203 87 | - | - | - | 310 16 |
| French hall, | 12 55 | 15 42 | 19 53 | 74 99 | - | - | - | 122 49 |
| Wilder hall, | 41 70 | 6 55 | 27 36 | 7 51 | - | - | - | 83 12 |
| Upper plant house, | - | 10 09 | 11 26 | 7 73 | - | - | - | 29 08 |
| Old Durfee range, | - | 59 | 14 63 | 35 96 | - | - | - | 51 18 |
| Horticultural barn, | 62 | - | - | 74 38 | - | - | - | 75 00 |
| Physics building, | 27 52 | 8 41 | 15 96 | 16 22 | - | - | - | 68 11 |
| East experiment station, | 34 | 37 03 | 62 05 | 7 82 | - | - | - | 107 24 |
| West experiment station, | 11 10 | 39 59 | 21 71 | 166 42 | - | - | - | 238 82 |
| Experiment station barn, | - | 18 95 | 57 07 | 7 35 | - | - | - | 83 37 |
| Rural engineering building, | 7 67 | - | 17 82 | 18 61 | - | - | - | 44 10 |
| Microbiology building, | 45 50 | 9 75 | 3 27 | 18 80 | - | - | $150 00 | 227 32 |
| Draper hall, | 36 91 | 174 87 | 67 19 | 487 33 | - | - | 880 60 | 1,646 90 |
| Hospital, | 4 35 | 20 15 | 9 59 | 54 96 | - | - | - | 89 05 |
| Stockbridge hall, | 116 43 | 57 50 | 7 56 | 278 83 | - | - | 13 00 | 473 32 |
| Cold-storage building, | - | - | - | 3 14 | - | - | - | 3 14 |
| Machine barn, | - | 8 84 | - | 1 90 | - | - | - | 10 74 |
| Sheep barn, | - | 7 01 | - | 52 07 | - | - | - | 59 08 |
| Piggery, | - | - | - | 28 | - | - | - | 28 |
| Quarantine barn, | - | - | - | 78 75 | - | - | - | 78 75 |
| Poultry demonstration house, | - | - | - | 42 77 | - | - | - | 42 77 |
| Poultry feed house, | - | - | - | 24 00 | - | - | - | 24 00 |
| Poultry brooding house, | - | - | - | 1 18 | - | - | - | 1 18 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Poultry killing house, | - | - | - | 48 | - | - | - | 48 |
| Poultry judging house, | - | - | - | 30 04 | - | - | - | 30 04 |
| Poultry colony house, | - | - | - | 3 58 | - | - | - | 3 58 |
| North College, | 81 39 | 30 28 | 11 46 | 134 69 | 523 41 | - | 79 50 | 860 73 |
| South College, | 81 03 | 70 80 | 19 96 | 214 71 | 510 93 | - | 81 00 | 978 43 |
| Chapel, | 40 93 | 39 28 | 2 59 | 45 77 | 148 41 | $125 00 | - | 401 98 |
| College residences: — | | | | | | | | |
| Harlow place, | - | - | - | 97 84 | - | - | - | 97 84 |
| Kellogg place, | 24 | 21 34 | - | 40 21 | - | - | 10 31 | 72 10 |
| Goldberg place, | - | 1 12 | - | - | - | - | - | 1 12 |
| President's house, | 2 58 | 14 61 | 8 70 | 216 90 | - | - | - | 242 79 |
| Waugh house, | 1 70 | 3 26 | 7 83 | 72 19 | - | - | - | 84 98 |
| Registrar's house, | - | - | 6 11 | 26 | - | - | - | 6 37 |
| Farm superintendent's house, | 3 75 | 21 25 | 27 94 | 117 64 | - | - | - | 170 58 |
| Farm help's house, | - | 10 64 | - | 27 69 | - | - | 8 40 | 46 73 |
| Stockbridge house, | - | 4 10 | - | 11 30 | - | - | - | 15 40 |
| Farm cottage, | - | 27 21 | 44 40 | 3 04 | - | - | - | 74 65 |
| Totals, | $636 37 | $1,097 79 | $712 89 | $3,890 73 | $1,431 40 | $125 00 | $1,222 81 | $9,116 99 |

### *Summary.*

| | |
|---|---|
| General, | $62,548 53 |
| College buildings, | 8,304 43 |
| College residences, | 812 56 |
| Total, | $71,665 52 |

## Experiment Station.

*Disbursements and Receipts.*

| Accounts. | Disbursements from Dec. 1, 1915, to Nov. 30, 1916. | Receipts from Dec. 1, 1915, to Nov. 30, 1916. | Apportionment for Year ending Nov. 30, 1916. | Balance to Credit. |
|---|---|---|---|---|
| Administration, | $1,029 25 | $13 46 | $1,200 00 | $184 21 |
| Agricultural economics, | 650 24 | - | 1,000 00 | 349 76 |
| Agricultural, | 7,417 23 | 5,080 69 | 3,100 00 | 763 46 |
| Apiculture, | 102 73 | - | 100 00 | —2 73 |
| Asparagus, | 12 26 | - | 350 00 | 337 74 |
| Botanical, | 1,589 04 | 30 00 | 1,600 00 | 40 96 |
| Chemical, | 12,069 86 | 12,002 98 | 1,000 00 | 933 12 |
| Cranberry, | 3,106 97 | 2,771 12 | 3,000 00 | 2,664 15 |
| Entomological, | 452 21 | - | 600 00 | 147 79 |
| Equipment, | 717 02 | - | 750 00 | 32 98 |
| Feed inspection, | 5,632 53 | 6,000 00 | - | - |
| Fertilizer inspection, | 11,434 88 | 9,400 00 | - | - |
| Freight and express, | 382 33 | 91 26 | 400 00 | 108 93 |
| Graves' orchard, | 658 13 | 1,131 15 | 800 00 | 1,273 02 |
| Horticultural, | 1,700 83 | 53 08 | 1,600 00 | —47 75 |
| Library, | 682 10 | - | 700 00 | 17 90 |
| Microbiology, | 273 80 | - | 1,000 00 | 726 20 |
| Meteorology, | 369 11 | - | 375 00 | 5 89 |
| Poultry, | 1,811 21 | - | 1,800 00 | —11 21 |
| Publications, | 795 14 | - | 800 00 | 4 86 |
| Salaries, | 42,986 41 | - | 43,400 00 | 413 59 |
| Tillson Farm, | 1,921 78 | 320 96 | 500 00 | —1,100 82 |
| Treasurer's office, | 181 70 | - | 425 00 | 243 30 |
| Veterinary, | 943 73 | - | 725 00 | —218 73 |
| Hatch fund, | - | 15,000 00 | - | - |
| Adams fund, | - | 15,000 00 | - | - |
| State fund, | - | 30,000 00 | - | - |
| Blood test, | 34 10 | 506 00 | - | - |
| Totals, | $96,954 59 | $97,400 70 | $65,225 00 | - |
| Balance beginning fiscal year Dec. 1, 1915. | - | 8,077 29 | - | - |
| Balance on hand Nov. 30, 1916, | 8,523 40 | - | - | - |
|  | $105,477 99 | $105,477 99 | - | - |

## EXPERIMENT STATION — *Continued.*

*Comparative Disbursements and Receipts, 1915–16.*

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | 1915. | 1916. | 1915. | 1916. |
| Administration, | $1,011 28 | $1,029 25 | $34 72 | $13 46 |
| Agriculture, | 5,247 13 | 7,417 23 | 2,365 01 | 5,080 69 |
| Asparagus, | 701 48 | 12 26 | – | – |
| Botanical, | 1,469 01 | 1,589 04 | 3 00 | 30 00 |
| Chemical, | 11,015 52 | 12,069 86 | 10,732 09 | 12,002 98 |
| Cranberry, | 3,015 05 | 3,106 97 | 2,437 01 | 2,771 12 |
| Entomology, | 477 98 | 452 21 | – | – |
| Feed inspection, | 5,337 54 | 5,632 53 | 6,000 00 | 6,000 00 |
| Fertilizer inspection, | 10,047 01 | 11,434 88 | 10,088 00 | 9,400 00 |
| Freight and express, | 311 55 | 382 33 | 32 | 91 26 |
| Graves' orchard, | 737 73 | 658 13 | 1,027 19 | 1,131 15 |
| Horticultural, | 1,803 75 | 1,700 83 | 187 64 | 53 08 |
| Library, | 855 91 | 682 10 | – | – |
| Meteorology, | 278 49 | 369 11 | – | – |
| Poultry, | 2,034 82 | 1,811 21 | 4 33 | – |
| Publications, | 818 66 | 795 14 | – | – |
| Salaries, | 39,199 74 | 42,986 41 | – | – |
| Treasurer's office, | 377 87 | 181 70 | – | – |
| Veterinary, | 238 11 | 943 73 | – | – |
| Equipment, | 1,821 22 | 717 02 | – | – |
| Agricultural economics, | 605 94 | 650 24 | – | – |
| Apiculture, | – | 102 73 | – | – |
| Microbiology, | 773 08 | 273 80 | – | – |
| Miscellaneous, | – | – | 90 00 | – |
| Tillson farm, | – | 1,921 78 | – | 320 96 |
| Blood test, | – | 34 10 | – | 506 00 |
| Hatch fund, | – | – | 15,000 00 | 15,000 00 |
| Adams fund, | – | – | 15,000 00 | 15,000 00 |
| State fund, | – | – | 25,000 00 | 30,000 00 |
| Totals, | $88,178 87 | $96,954 59 | $87,969 31 | $97,400 70 |
| Balance at beginning of fiscal year, | – | – | 8,286 85 | 8,077 29 |
| Balance on hand at close of fiscal year, | 8,077 29 | 8,523 40 | – | – |
| | $96,256 16 | $105,477 99 | $96,256 16 | $105,477 99 |

## EXPERIMENT STATION — *Concluded.*

### *Analysis of Experiment Station Accounts.*

| | Adams Fund. | Feed Law. | Fertilizer Law. | Hatch Fund. | State Fund. | Totals. |
|---|---|---|---|---|---|---|
| Salaries, | $15,357 88 | $4,218 71 | $7,490 42 | $14,883 69 | $12,744 84 | $54,695 54 |
| Labor, | – | 267 73 | 1,315 59 | – | 20,683 93 | 22,267 25 |
| Publications, | – | 24 50 | 633 00 | – | 425 89 | 1,083 39 |
| Postage and stationery, | – | 39 10 | 192 76 | – | 1,391 19 | 1,623 05 |
| Freight and express, | – | – | 43 79 | – | 431 51 | 475 30 |
| Heat, light, water and power, | – | 42 50 | 174 03 | – | 180 61 | 397 14 |
| Chemical and laboratory supplies, | – | 162 65 | 688 66 | – | 977 09 | 1,828 40 |
| Seeds, plants and sundry supplies, | – | 74 56 | 62 86 | – | 2,584 81 | 2,722 23 |
| Fertilizers, | – | – | – | – | 868 16 | 868 16 |
| Feeding stuffs, | – | – | – | – | 1,896 68 | 1,896 68 |
| Library, | – | 8 10 | – | – | 791 27 | 799 37 |
| Tools, machinery and appliances, | – | 6 75 | 30 24 | – | 764 89 | 801 88 |
| Furniture and fixtures, | – | – | 3 30 | – | 303 93 | 307 23 |
| Scientific apparatus and specimens, | – | – | 26 21 | – | 311 97 | 338 18 |
| Live stock, | – | 350 00 | – | – | 457 65 | 807 65 |
| Traveling expenses, | – | 435 04 | 749 02 | – | 2,492 50 | 3,676 56 |
| Contingent expenses, | – | – | – | – | 30 00 | 30 00 |
| Buildings and land, | – | 2 89 | 25 00 | – | 2,247 72 | 2,275 61 |
| Equipment, | – | – | – | – | 60 97 | 60 97 |
| Totals, | $15,357 88 | $5,632 53 | $11,434 88 | $14,883 69 | $49,645 61 | $96,954 59 |

### *Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| Cash on hand Dec. 1, 1915, | – | $8,080 12 |
| Receipts from State Treasurer, | – | 36,000 00 |
| Receipts from United States Treasurer, | – | 30,000 00 |
| Receipts from other sources, | – | 31,400 70 |
| Total disbursements, | $96,954 59 | – |
| | $96,954 59 | $105,480 82 |
| Bills receivable Dec. 1, 1915, deducted, | – | 865 22 |
| Bills payable Dec. 1, 1915, deducted, | 862 39 | – |
| | $96,092 20 | $104,615 60 |
| Bills receivable Nov. 30, 1916, | – | 2,776 06 |
| Bills payable Nov. 30, 1916, | 865 00 | – |
| Balance, | 10,434 46 | – |
| | $107,391 66 | $107,391 66 |

## EXTENSION SERVICE.

### *Disbursements and Receipts.*

| CLASSIFICATION. | Disbursements. | Receipts. | Apportionment. | Balance. |
|---|---|---|---|---|
| Administration, | $1,502 91 | $92 05 | $1,700 00 | $289 14 |
| Director's office, | 1,263 32 | 44 28 | 1,300 00 | 80 96 |
| Salaries, | 29,646 19 | 121 67 | 29,862 59 | 338 07 |
| Correspondence courses, | 1,078 64 | 696 96 | 200 00 | —181 68 |
| Civic improvement, | 1,310 16 | 986 11 | 450 00 | 125 95 |
| Community planning, | 697 86 | 2 25 | 550 00 | —145 61 |
| Library extension, | 199 93 | – | 200 00 | 07 |
| Lectures, | 221 23 | 1 00 | 500 00 | 279 77 |
| Exhibits, | 1,250 26 | 525 00 | 500 00 | —225 26 |
| Equipment, | 704 91 | – | 1,800 00 | 1,095 09 |
| Pomology, | 284 54 | 88 20 | 400 00 | 203 66 |
| Printing and publicity, | 967 09 | 134 92 | 1,000 00 | 167 83 |
| Animal husbandry, | 230 22 | 2 00 | 350 00 | 121 78 |
| Agricultural education, | 2,386 27 | 53 | 2,300 00 | —85 74 |
| Farm management, | 397 26 | 109 50 | 100 00 | —187 76 |
| Poultry husbandry, | 99 21 | 9 78 | 150 00 | 60 57 |
| Home economics, | 354 81 | – | 350 00 | —4 81 |
| Short courses, | 11,520 87 | 2,805 78 | 9,220 00 | 504 91 |
| Dairying, | 71 91 | – | 200 00 | 128 09 |
| County and local agents, | 463 65 | 24 20 | 520 00 | 80 55 |
| Agricultural economics, | 690 62 | 17 79 | 600 00 | —72 83 |
| Reserve and emergency, | – | – | 9,357 14 | – |
| State treasurer, | – | 50,000 00 | – | – |
| Totals, | $55,341 86 | $55,662 02 | $61,609 73 | $2,572 75 |
| Balance at beginning of fiscal year Dec. 1, 1915, | – | 11,719 54 | – | – |
| Balance on hand Dec. 1, 1916, | 12,039 70 | – | – | – |
| Totals, | $67,381 56 | $67,381 56 | – | – |

### *Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| Balance Dec. 1, 1915, | – | $12,622 56 |
| Receipts Nov. 30, 1916, | – | 5,662 02 |
| Received from State Treasurer, | – | 50,000 00 |
| Received from United States Treasurer, | – | 14,151 90 |
| Disbursements to Nov. 30, 1916, | $69,883 31[1] | – |
| | $69,883 31 | $82,436 48 |
| Bills receivable Dec. 1, 1915, deducted, | – | 152 00 |
| Bills payable Dec. 1, 1915, deducted, | 594 31 | – |
| | $69,289 00 | $82,284 48 |
| Bills receivable Nov. 30, 1916, | – | 622 12 |
| Bills payable Nov. 30, 1916, | 116 87 | – |
| Balance, | 13,500 73 | – |
| | $82,906 60 | $82,906 60 |

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[1] Includes Federal Smith-Lever fund.

## EXTENSION SERVICE — *Concluded.*

### *Analysis of Extension Service Disbursements.*

| | Travel. | Equipment. | Printing. | Supplies. | Instruction and Lectures. | Salaries. | Miscellaneous. | Totals. |
|---|---|---|---|---|---|---|---|---|
| Administration, | $790 68 | – | – | $694 38 | – | – | $17 85 | $1,502 91 |
| Agricultural education, | 915 25 | $177 81 | – | 999 03 | – | – | 461 99 | 2,554 08 |
| Agricultural economics, | 582 96 | 29 15 | – | 107 66 | – | – | – | 719 77 |
| Animal husbandry, | 144 22 | – | – | 86 00 | – | – | – | 230 22 |
| Agricultural camps, | 40 15 | – | – | 587 01 | – | – | 25 00 | 652 16 |
| Apple packing, | – | – | – | 29 32 | – | – | – | 29 32 |
| Bankers' conference, | 109 80 | – | – | 45 25 | – | – | – | 155 05 |
| Beekeeping, | 1 44 | – | – | 123 89 | – | – | – | 125 33 |
| Civic improvements, | 526 82 | 27 65 | – | 783 34 | – | – | – | 1,337 81 |
| Community planning, | 587 40 | 40 00 | – | 110 46 | – | – | – | 737 86 |
| Conference rural community planning, | – | – | – | 37 59 | – | – | – | 37 59 |
| Correspondence courses, | 153 68 | 40 08 | – | 924 96 | – | – | – | 1,118 72 |
| County agents, | 442 57 | 88 27 | – | 21 08 | – | – | – | 551 92 |
| County agents' conference, | 22 25 | – | – | 35 04 | – | – | – | 57 29 |
| Dairying, | 4 87 | – | – | 67 04 | – | – | – | 71 91 |
| Directors' office, | – | 134 38 | – | 1,231 21 | – | – | 32 11 | 1,397 70 |
| Exhibits, | 85 68 | – | – | – | – | – | 1,164 58 | 1,250 26 |
| Farmers' week, | 643 47 | – | – | 271 00 | $398 55 | – | – | 1,313 02 |
| Home economics, | 185 18 | 48 02 | – | 169 63 | – | – | – | 402 83 |
| Library extension, | – | – | – | 199 93 | – | – | – | 199 93 |
| Miscellaneous, | – | – | – | 34 06 | – | – | – | 34 06 |
| Pomology, | 155 73 | 109 05 | – | 128 81 | – | – | – | 393 59 |
| Poultry convention, | 10 95 | – | – | 313 76 | – | – | – | 324 71 |
| Poultry husbandry, | 39 53 | 10 50 | – | 59 68 | – | – | – | 109 71 |
| Printing and publications, | 47 70 | – | – | 919 39 | – | – | – | 967 09 |
| Salaries, | – | – | – | – | – | $32,043 69 | – | 32,043 69 |
| Supervision, | – | – | – | 58 | – | – | – | 58 |
| Summer school, | 80 02 | – | $400 56 | 838 36 | 3,032 56 | – | 111 65 | 4,463 15 |
| Ten weeks' course, | – | – | 265 28 | 1,031 23 | 604 60 | – | 30 00 | 1,931 11 |
| Farm demonstration, | – | – | – | 397 26 | – | – | – | 397 26 |
| Lectures, | 43 71 | – | – | – | – | – | 177 52 | 221 23 |
| Totals, | $5,614 06 | $704 91 | $665 84 | $10,246 95 | $4,035 71 | $32,043 69 | $2,020 70 | $55,331 86 |

## SMITH-LEVER FUND (FEDERAL).

| | Disbursements. | Receipts. |
|---|---|---|
| Salaries, | $8,900 37 | – |
| Home economics, | 623 24 | – |
| Animal husbandry, | 412 92 | – |
| Dairying, | 288 20 | – |
| Pomology, | 382 30 | – |
| Farm management, | 473 10 | – |
| Boys' and Girls' Club, | 1,174 48 | – |
| Poultry, | 682 38 | – |
| Extension school, | 328 57 | – |
| Publications and printing, | 924 08 | – |
| State leader, | 351 81 | – |
| State Treasurer, | – | $14,151 90 |
| Totals, | $14,541 45 | $14,151 90 |
| Balance at beginning of fiscal year, Dec. 1, 1915, | – | 1,984 58 |
| Balance on hand Nov. 30, 1915, | 1,595 03 | – |
| | $16,136 48 | $16,136 48 |

## SPECIAL APPROPRIATIONS.

| | Date made. | Amount of Apportionment. | Amount previously expended. | Amount expended during Fiscal year. | Amount expended to Date. | Amount received from State Treasurer. | Balance on Hand with State Treasurer. |
|---|---|---|---|---|---|---|---|
| Agricultural building, | 1914 | $210,000 00 | $192,824 67 | $16,109 87 | $208,934 54 | $208,934 54 | $1,065 46 |
| Microbiology building, | 1915 | 67,500 00 | 14,754 27 | 47,935 38 | 62,689 65 | 62,689 65 | 4,810 35 |
| Improvements and equipment, | 1916 | 20,000 00 | - | 17,336 77 | - | - | 2,663 23 |
| Agricultural building, | 1916 | 13,732 34 | - | 12,243 49 | - | - | 1,488 85 |
| Retaining wall and platform, | 1916 | 4,200 00 | - | 4,200 00 | - | - | - |
| Rural engineering shop, | 1916 | 12,000 00 | - | 9,617 67 | - | - | 2,382 33 |
| Totals, | . . | $327,432 34 | $207,578 94 | $107,443 18 | $271,624 19 | $271,624 19 | $12,410 22 |

## INVENTORY — REAL ESTATE.

### *Land (Estimated Value).*

| | |
|---|---|
| Allen place, | $500 00 |
| Baker place, | 2,500 00 |
| Bangs place, | 2,350 00 |
| Brown land, | 500 00 |
| Charmbury place, | 450 00 |
| Clark place, | 4,500 00 |
| College farm, | 37,000 00 |
| Cranberry land, | 10,975 50 |
| Dickinson land, | 7,850 00 |
| Harlow farm, | 3,284 63 |
| Hawley and Brown place, | 675 00 |
| Kellogg farm, | 5,868 45 |
| Loomis place, | 415 00 |
| Louisa Baker place, | 5,000 00 |
| Newell farm, | 2,800 00 |
| Old creamery place, | 1,000 00 |
| Owen farm, | 5,000 00 |
| Pelham quarry, | 500 00 |
| Wescott place, | 2,250 00 |
| Total, | $93,418 58 |

### *College Buildings (Estimated Value).*

| | Inventory at Beginning of Year. | Per Cent. | Value at Beginning of Year less Per Cent. Deterioration. | Repairs and Improvements during Year. | Total Value. |
|---|---|---|---|---|---|
| Apiary, | $3,042 08 | 2 | $2,981 24 | $61 25 | $3,042 49 |
| Animal husbandry building, | 9,825 50 | 2 | 9,62 99 | 10 34 | 9,639 33 |
| Chemical laboratory, | 7,735 90 | 5 | 7,349 10 | 1,014 03 | 8,363 13 |
| Clark hall, | 66,459 04 | 2 | 65,129 86 | 541 30 | 65,671 16 |
| Cold-storage laboratory, | 11,851 09 | 2 | 11,614 07 | 3 14 | 11,617 21 |
| Dairy building, | 74,224 17 | 2 | 72,739 69 | 458 53 | 73,198 22 |
| Dairy barn and storage, | 29,180 06 | 3 | 28,304 66 | 417 34 | 28,722 00 |
| Dining hall, | 58,703 87 | 3 | 56,942 75 | 766 30 | 57,709 05 |
| Drill hall and gun shed, | 9,640 28 | 5 | 9,158 27 | 224 97 | 9,383 24 |
| Durfee glass houses, old, | 9,548 50 | 5 | 9,071 07 | 51 18 | 9,122 25 |
| Durfee glass houses, new, | 14,576 72 | 5 | 13,847 88 | – | 13,847 88 |
| Entomology building, | 78,773 17 | 2 | 77,197 71 | 360 51 | 77,558 22 |
| Farm bungalow, | 2,046 63 | 3 | 1,985 23 | 74 65 | 2,059 88 |
| Farmhouse, | 2,482 07 | 3 | 2,407 61 | 170 58 | 2,578 19 |
| French hall, | 49,710 76 | 2 | 48,716 54 | 122 49 | 48,839 03 |
| Horse barn, | 4,875 71 | 3 | 4,729 44 | 128 72 | 4,858 16 |
| Horticultural barn, | 2,497 83 | 3 | 2,422 90 | 92 70 | 2,515 60 |
| Horticultural tool shed, | 1,940 00 | 3 | 1,881 80 | – | 1,881 80 |
| Hospital, | 15,452 28 | 2 | 15,143 23 | 89 05 | 15,232 28 |
| Machinery barn, | 3,885 07 | 3 | 3,768 52 | 10 74 | 3,779 26 |
| Mathematical building, | 5,751 14 | 5 | 5,463 58 | 58 30 | 5,521 88 |
| Microbiology building, | – | – | 62,144 41 | – | 62,144 41 |
| North dormitory, | 24,804 44 | 2 | 24,308 35 | 257 82 | 24,566 17 |
| Physics laboratory, | 5,339 06 | 5 | 5,072 11 | 68 11 | 5,140 22 |
| Piggery, | 2,920 47 | 3 | 2,832 86 | 28 | 2,833 14 |

*College Buildings (Estimated Value)* — Concluded.

| | Inventory at Beginning of Year. | Per Cent. | Value at Beginning of Year less Per Cent. Deterioration. | Repairs and Improvements during Year. | Total Value. |
|---|---|---|---|---|---|
| Poultry department: — | | | | | |
| Breeding houses, | $1,568 00 | 2 | $1,536 64 | – | $1,536 64 |
| Brooder house, | 1,083 55 | 2 | 1,061 88 | $1 18 | 1,063 06 |
| Incubator cellar and building, | 1,372 00 | 2 | 1,344 56 | 42 77 | 1,387 33 |
| Incubator cellar and storage building, | 800 00 | 2 | 784 00 | 727 12 | 1,511 12 |
| Crematory, | 50 00 | 2 | 49 00 | – | 49 00 |
| Duck house, | 100 00 | 2 | 98 00 | – | 98 00 |
| Killing and fattening laboratory, | 1,345 51 | 2 | 1,318 60 | 30 52 | 1,349 12 |
| Laying house, | 1,764 00 | 2 | 1,728 72 | – | 1,728 72 |
| Mechanics and storage building, | 1,894 67 | 2 | 1,856 78 | 79 46 | 1,936 24 |
| Transfer house, | – | – | 504 60 | – | 504 60 |
| Power plant and storage building, including coal pocket, | 30,872 28 | 2 | 30,254 83 | 5,024 89 | 35,279 72 |
| President's house, | 11,881 21 | 3 | 11,524 77 | 258 06 | 11,782 83 |
| Quarantine barn, | 194 00 | 3 | 188 18 | 329 31 | 517 49 |
| Rural engineering building, | 3,550 00 | 2 | 3,479 00 | 127 06 | 3,606 06 |
| Sheep barn, | 1,415 66 | 3 | 1,373 19 | 59 08 | 1,432 27 |
| South dormitory, | 35,248 44 | 2 | 34,543 47 | 981 88 | 35,525 35 |
| Stockbridge hall, | 184,000 00 | 2 | 180,320 00 | 1,136 73 | 181,456 73 |
| Agronomy greenhouse, | 2,150 00 | 2 | 2,107 00 | – | 2,107 00 |
| Stone chapel, | 29,510 58 | 2 | 28,920 37 | 147 64 | 29,068 01 |
| Three houses on Stockbridge Road, | 5,175 10 | 5 | 4,916 34 | 106 75 | 5,023 09 |
| Vegetable plant house, | 4,593 31 | 5 | 4,363 64 | 29 08 | 4,392 72 |
| Veterinary laboratory and stable, | 23,127 39 | 2 | 22,664 84 | 759 03 | 23,423 87 |
| Waiting station, | 495 80 | 2 | 485 88 | 5 90 | 491 78 |
| Wilder hall, | 36,812 29 | 2 | 36,076 04 | 83 12 | 36,159 16 |
| Young stock barn, | 6,419 50 | 3 | 6,226 91 | 8 63 | 6,235 54 |
| Totals, | $880,689 13 | – | $922,569 11 | $14,920 54 | $937,489 65 |

*College Equipment (Estimated Value).*

| | |
|---|---|
| Administrative division: — | |
| Dean's office, | $519 05 |
| President's office, | 1,564 25 |
| Registrar's office, | 931 46 |
| Treasurer's office, | 2,571 25 |
| Agricultural division: — | |
| Agronomy, | 6,710 90 |
| Animal husbandry, | 810 61 |
| Dairy, | 16,584 94 |
| Farm administration, | 1,119 67 |
| Farm management, | 37,596 58 |
| General agriculture, | 4,214 78 |
| Poultry, | 4,357 69 |
| Rural engineering, | 2,848 63 |
| Dining hall, | 6,843 86 |
| Extension, | 12,825 19 |
| General science: — | |
| Apiary, | 1,846 02 |
| Botanical, | 15,046 25 |
| Chemical, | 11,160 68 |
| Entomology, | 6,242 32 |
| Microbiology, | 7,017 37 |

| | | |
|---|---|---|
| General science — *Concluded.* | | |
| Mathematics, | | $2,367 50 |
| Physics, | | 5,349 57 |
| Veterinary, | | 10,439 93 |
| Zoölogical laboratory, | | 10,142 93 |
| Zoölogical museum, | | 6,511 05 |
| Graduate school, | | 97 88 |
| Horticultural division: — | | |
| Floriculture, | | 8,039 57 |
| Forestry, | | 2,326 60 |
| General horticulture, | | 7,602 47 |
| Grounds, | | 820 75 |
| Landscape gardening, | | 4,971 66 |
| Market gardening, | | 1,507 68 |
| Pomology, | | 5,772 61 |
| Hospital, | | 945 38 |
| Humanities, division of: — | | |
| Economics and sociology, | | 142 17 |
| Language and literature, | | 422 50 |
| Library, | | 89,655 85 |
| Military, | | 1,494 32 |
| Operating and maintenance: — | | |
| College supply, | | 1,127 62 |
| Fire apparatus, | | 1,851 15 |
| General maintenance, | | 93,239 00 |
| Equipment, | $79,769 17 | |
| Carpentry and masonry supplies, | 4,181 08 | |
| Electrical supplies, | 2,127 02 | |
| Heating and plumbing supplies, | 6,294 38 | |
| Painting supplies, | 867 35 | |
| Janitors' supplies, | | 870 51 |
| Sewer line, | | 12,385 50 |
| Water mains, | | 10,911 66 |
| Physical education, | | 2,511 00 |
| Rural social science: — | | |
| Agricultural economics, | | 563 95 |
| Agricultural education, | | 499 99 |
| Rural sociology, | | 258 02 |
| Textbooks, | | 527 39 |
| Trophy room, | | 1,564 74 |
| Total, | | $425,732 45 |

### *Experiment Station Buildings (Estimated Value).*

| | Inventory at Beginning of Year. | Per Cent. | Cost at Beginning of Year less Per Cent. Deterioration. | Repairs and Improvements. | Total Value. |
|---|---|---|---|---|---|
| Agricultural laboratory, . . . . | $15,162 51 | 2 | $14,859 26 | $107 24 | $14,966 50 |
| Agricultural barns, . . . . . | 4,882 27 | 3 | 4,735 80 | 41 67 | 4,777 47 |
| Agricultural farmhouse, . . . . | 1,455 00 | 3 | 1,411 35 | 1 12 | 1,412 47 |
| Agricultural glass house, . . . . | 475 00 | 5 | 451 25 | – | 451 25 |
| Cranberry buildings, . . . . . | 2,645 00 | – | 2,490 00 | – | 2,490 00 |
| Plant and animal chemistry laboratory, | 29,512 13 | 2 | 28,921 89 | 238 82 | 29,160 71 |
| Plant and animal chemistry barns, . | 3,999 28 | 3 | 3,879 30 | 41 68 | 3,920 98 |
| Plant and animal chemistry dairy, . | 1,940 00 | 3 | 1,881 80 | – | 1,881 80 |
| Six poultry houses, . . . . . | 588 00 | 2 | 576 24 | – | 576 24 |
| Entomological glass houses, . . | 783 75 | 5 | 744 56 | – | 744 56 |
| Totals, . . . . . . . . | $61,442 94 | – | $59,951 45 | $430 53 | $60,381 98 |

### *Experiment Station Equipment (Estimated Value).*

| | |
|---|---|
| Agricultural laboratory, . . . . . . . . . . | $7,212 13 |
| Botanical laboratory, . . . . . . . . . . | 6,465 74 |
| Chemical laboratory, . . . . . . . . . . | 22,147 02 |
| Cranberry station, . . . . . . . . . . | 3,052 53 |
| Director's office, . . . . . . . . . . | 5,071 45 |
| Entomological laboratory, . . . . . . . . . | 23,562 45 |
| Horticultural laboratory, . . . . . . . . . | 4,159 05 |
| Meteorology laboratory, . . . . . . . . . | 855 00 |
| Microbiology laboratory, . . . . . . . . . | 577 45 |
| Poultry department, . . . . . . . . . . | 5,312 03 |
| Treasurer's office, . . . . . . . . . . | 1,118 00 |
| Veterinary laboratory, . . . . . . . . . | 40 16 |
| Total, . . . . . . . . . . . . | $79,573 01 |

### *Inventory Summary.*

| | |
|---|---|
| Land, . . . . . . . . . . . . | $93,418 58 |
| College buildings, . . . . . . . . . . | 937,489 65 |
| College equipment, . . . . . . . . . . | 425,732 45 |
| Experiment station buildings, . . . . . . . . | 60,381 98 |
| Experiment station equipment, . . . . . . . | 79,573 01 |
| Total, . . . . . . . . . . . | $1,596,595 67 |

## STUDENTS' TRUST FUND ACCOUNT.

| | Disbursements for Year ending Nov. 30, 1915. | Receipts for Year ending Nov. 30, 1916. | Balance on Hand. | Balance brought forward Dec. 1, 1915. |
|---|---|---|---|---|
| Athletics, | $9,879 20 | $9,341 80 | $1,804 51 | $2,341 91 |
| College signal, | 8 73 | - | - | 8 73 |
| Dining hall, | 60,698 73 | 54,809 34 | —12,005 19 | —6,115 80 |
| Keys, | 89 25 | 80 00 | 35 75 | 45 00 |
| Student deposits, | 19,226 23 | 20,142 00 | 8,057 24 | 7,141 47 |
| Social union, | 890 39 | 1,125 19 | 934 40 | 699 60 |
| Textbooks, | 4,535 59 | 4,781 07 | 1,181 87 | 936 39 |
| Athletic field, | 639 75 | 1,584 69 | —252 22 | —1,197 16 |
| Uniforms, | 3,589 90 | 2,704 85 | 2,423 64 | 3,308 69 |
| 1916 index, | 400 00 | 394 24 | - | 5 76 |
| Totals, | $99,957 77 | $94,963 18 | $2,180 00 | $7,174 59 |
| Balance on hand Dec. 1, 1915, | - | 7,174 59 | - | - |
| Balance on hand Nov. 30, 1916, | 2,180 00 | - | - | - |
| | $102,137 77 | $102,137 77 | - | - |

## DETAILED STATEMENT OF DINING HALL.

| | | Liabilities. | Resources. |
|---|---|---|---|
| **1915.** | | | |
| Dec. 1. | Balance, | $6,115 80 | |
| **1916.** | | | |
| Nov. 30. | Total disbursements, | 60,698 73 | |
| | Outstanding bills, | 3,860 88 | |
| | Total collections, | | $54,809 34 |
| | Accounts outstanding, | | 2,174 03 |
| | Inventory, | | 3,110 30 |
| | Balance, | | 10,581 74 |
| | | $70,675 41 | $70,675 41 |

## ENDOWMENT FUND.[1]

| | Principal. | Income. |
|---|---|---|
| United States grant (5 per cent.), | $219,000 00 | $7,300 00 |
| Commonwealth grant (3½ per cent.), | 142,000 00 | 3,313 32 |
| | - | $10,613 32 |

[1] This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

## Burnham Emergency Fund.

| | Market Value Dec. 1, 1916. | Par Value. | Income. |
|---|---|---|---|
| Two bonds American Telephone and Telegraph Company 4s, at $910, | $1,820 00 | $2,000 00 | $80 00 |
| Two bonds Western Electric Company 5s, at $1,000, | 2,000 00 | 2,000 00 | 100 00 |
| | $3,820 00 | $4,000 00 | $180 00 |
| Unexpended balance Dec. 1, 1915, | – | – | 320 55 |
| Cash on hand Nov. 30, 1916, | – | – | $500 55 |

## Library Fund.

| | | | |
|---|---|---|---|
| Five bonds New York Central & Hudson River Railroad Company 4s, at $930, | $4,650 00 | $5,000 00 | $200 00 |
| Five bonds Lake Shore & Michigan Southern Railroad Company 4s, at $950, | 4,750 00 | 5,000 00 | 200 00 |
| Two shares New York Central & Hudson River Railroad Company stock, at $102, | 204 00 | 200 00 | 10 00 |
| Amherst Savings Bank, deposit, | 167 77 | 167 77 | 7 09 |
| | $9,771 77 | $10,367 77 | $417 09 |
| Nov. 20, 1916, transferred to college library account, | – | – | 417 09 |

## Special Funds.

### *Endowed Labor Fund (the Gift of a Friend of the College).*

| | | | |
|---|---|---|---|
| Two bonds American Telephone and Telegraph Company 4s, at $910, | $1,820 00 | $2,000 00 | $80 00 |
| Two bonds Lake Shore & Michigan Southern Railroad Company 4s, at $950, | 1,900 00 | 2,000 00 | 80 00 |
| One bond New York Central Railroad debenture 4s, | 930 00 | 1,000 00 | 40 00 |
| Amherst Savings Bank, deposit, | 143 39 | 143 39 | 6 07 |
| One bond Metropolitan Street Railway of Kansas City, 5s, | 950 00 | 1,000 00 | 100 00 |
| | $5,743 39 | $6,143 39 | $306 07 |
| Unexpended balance Dec. 1, 1915, | – | – | 230 97 |
| Cash on hand Nov. 30, 1916, | – | – | $537 04 |

### *Whiting Street Scholarship Fund.*

| | | | |
|---|---|---|---|
| One bond New York Central debenture 4s, | $930 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank, deposit, | 271 64 | 271 64 | 11 51 |
| | $1,201 64 | $1,271 64 | $51 51 |
| Unexpended balance Dec. 1, 1915, | – | – | 187 67 |
| Cash on hand Nov. 30, 1916, | – | – | $239 18 |

## SPECIAL FUNDS — *Continued.*

### *Hills Fund.*

| | Market Value Dec. 1, 1916. | Par Value. | Income. |
|---|---|---|---|
| One bond American Telephone and Telegraph Company 4s, at | $910 00 | $1,000 00 | $40 00 |
| One bond New York Central & Hudson River Railroad debenture 4s, at | 930 00 | 1,000 00 | 40 00 |
| One bond New York Central & Hudson River Railroad debenture 3½s, at | 870 00 | 1,000 00 | 17 50 |
| Two bonds Metropolitan Street Railway of Kansas City 5s, at $950, | 1,900 00 | 2,000 00 | 90 00 |
| Three bonds Pacific Telephone and Telegraph Company 5s, at $990, | 2,970 00 | 3,000 00 | 150 00 |
| One bond Western Electric Company 5s, at | 1,000 00 | 1,000 00 | 50 00 |
| Boston & Albany Railroad stocks, 3⅝ shares, at $187, | 677 88 | 362 50 | 31 68 |
| Amherst Savings Bank, deposit, | 72 75 | 72 75 | 3 06 |
| Electric Securities Company bonds, $1\frac{9}{50}$, at $1,000, | 1,121 00 | 1,180 00 | 59 00 |
| Electric Securities Company bonds, $1\frac{9}{50}$, at $1,000 changing serial, | – | – | 41 30 |
| Kansas City Street Railway 5½s, | – | – | 110 00 |
| New York Central & Hudson River, | – | – | 20 00 |
| New York Central & Hudson River rights, | – | – | 5 00 |
| | $10,451 63 | $10,615 25 | $657 54 |
| Unexpended balance Dec. 1, 1915, | – | – | 899 77 |
| | – | – | 1,557 31 |
| Disbursements for fiscal year ending Nov. 30, 1916, | – | – | 176 90 |
| Cash on hand Nov. 30, 1916, | – | – | $1,380 41 |

### *Mary Robinson Fund.*

| | | | |
|---|---|---|---|
| Amherst Savings Bank, | $142 00 | $142 00 | $6 03 |
| Boston & Albany Railroad stock, ⅜ share, at $187, | 70 13 | 38 00 | 3 32 |
| Electric Securities Company bonds, $\frac{41}{50}$ share, at $1,000, | 779 00 | 820 00 | 41 00 |
| Electric Securities Company bonds, $\frac{41}{50}$ share, at $1,000, changing for later serial number, | – | – | 28 70 |
| | $991 13 | $1,000 00 | $79 05 |
| Unexpended balance Dec. 1, 1915, | – | – | 59 63 |
| Cash on hand Nov. 30, 1916, | – | – | $138 68 |

### *Grinnell Prize Fund.*

| | | | |
|---|---|---|---|
| Ten shares New York Central & Hudson River Railroad stock, at $102, | $1,020 00 | $1,000 00 | $50 00 |
| Unexpended balance Dec. 1, 1915, | – | – | 195 74 |
| | $1,020 00 | $1,000 00 | $245 74 |
| Disbursements for prizes, | – | – | 50 00 |
| Cash on hand Nov. 30, 1916, | – | – | $195 74 |

### *Gassett Scholarship Fund.*

| | | | |
|---|---|---|---|
| One bond New York Central & Hudson River Railroad debenture 4s, | $930 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank, deposit, | 11 64 | 11 64 | 46 |
| | $941 64 | $1,011 64 | $40 46 |
| Unexpended balance Dec. 1, 1915, | – | – | 142 31 |
| Cash on hand Nov. 30, 1916, | – | – | $182 77 |

## SPECIAL FUNDS — *Concluded.*

### *Massachusetts Agricultural College (Investment).*

| | | Market Value Dec. 1, 1916. | Par Value. | Income. |
|---|---|---|---|---|
| One share New York Central & Hudson River Railroad stock, | | $102 00 | $100 00 | $5 00 |
| Unexpended balance Dec. 1, 1915, | | – | – | 75 45 |
| Cash on hand Nov. 30, 1916, | | – | – | $80 45 |

### *Danforth Keyes Bangs Fund.*

| | | | | |
|---|---|---|---|---|
| Two bonds Pacific Telephone and Telegraph Company 5s, at $990, | | $1,980 00 | $2,000 00 | $100 00 |
| Two bonds Union Electric Light and Power Company 5s, at $980, | | 1,960 00 | 2,000 00 | 100 00 |
| Two bonds American Telephone and Telegraph Company 4s, at $910, | | 1,820 00 | 2,000 00 | 80 00 |
| Interest from student loans, | | – | – | 42 63 |
| | | $5,760 00 | $6,000 00 | $322 63 |
| Unexpended balance Dec. 1, 1915, | | – | – | 671 62 |
| | | – | – | $994 25 |
| Total loans made to students during fiscal year, | $1,345 00 | | | |
| Cash received on account of student loans, | 1,351 00 | | | |
| Excess over loans made to students, | | . . . | . . . | 6 00 |
| Cash on hand Nov. 30, 1916, | | – | – | $1,000 25 |

### *John C. Cutter Fund.*

| | | | | |
|---|---|---|---|---|
| One bond Pacific Telephone and Telegraph Company 5s, | | $990 00 | $1,000 00 | $50 00 |
| Unexpended balance Dec. 1, 1915, | | – | – | 47 84 |
| | | $990 00 | $1,000 00 | $97 84 |
| Disbursements for fiscal year to date, | | – | – | 29 67 |
| Cash on hand Nov. 30, 1916, | | – | – | $68 17 |

### *William R. Sessions Fund.*

| | | | | |
|---|---|---|---|---|
| One bond New York Central & Hudson River Railroad stock 6s, | | $555 00 | $500 00 | $30 00 |
| Amherst Savings Bank, deposit, | | 4,500 00 | 4,500 00 | 146 25 |
| Disbursements for fiscal year to date, | $126 09 | $5,055 00 | $5,000 00 | $176 25 |
| Refund for fiscal year to date, | 35 40 | – | – | 90 69 |
| | | – | – | $85 56 |
| Cash on hand Nov. 30, 1915, | | – | – | 15 00 |
| Cash on hand Nov. 30, 1916, | | – | – | $100 56 |

### *Alvord Dairy Scholarship Fund.*

| | | | | |
|---|---|---|---|---|
| Amherst Savings Bank, deposit, | | $4,000 00 | $4,000 00 | $170 00 |
| Overdraft Dec. 1, 1915, | $600 00 | – | – | – |
| Less amount of receipts, | 170 00 | – | – | – |
| Overdraft Nov. 30, 1916, | | – | – | –$430 00 |

## SUMMARY OF BALANCES ON HAND OF THE INCOME FROM FUNDS HELD IN TRUST BY THE MASSACHUSETTS AGRICULTURAL COLLEGE.

| | |
|---|---|
| Burnham emergency, | $500 55 |
| Endowed labor fund, | 537 04 |
| Whiting Street scholarship fund, | 239 18 |
| Hills fund, | 1,380 41 |
| Mary Robinson fund, | 138 68 |
| Grinnell prize fund, | 195 74 |
| Gassett scholarship fund, | 182 77 |
| Massachusetts Agricultural College investment fund, | 80 45 |
| Danforth Keyes Bangs fund, | 1,000 25 |
| John C. Cutter fund, | 68 17 |
| Willam R. Sessions fund, | 100 56 |
| | $4,423 80 |
| Alvord dairy scholarship fund overdraft, | 430 00 |
| | $3,993 80 |

I hereby certify that I have this day examined the Massachusetts Agricultural College account, as reported by the Treasurer, Fred C. Kenney, for the year ending Nov. 30, 1916. All bonds and investments are as represented in the treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

CHARLES A. GLEASON,
*Auditor.*

DEC. 18, 1916.

## HISTORY OF SPECIAL FUNDS.

| | |
|---|---|
| Burnham emergency fund: — A bequest of $5,000 from T. O. H. P. Burnham of Boston, made without any conditions. The trustees of the college directed that $1,000 of this fund should be used in the purchase of the Newell land and Goessmann library. The fund now shows an investment of | $4,000 00 |
| Library fund: — The library of the college at the present time contains 52,928 volumes. The income from the fund raised by the alumni and others is devoted to its increase, and additions are made from time to time as the needs of the different departments require. Dec. 27, 1883, William Knowlton gave $2,000; Jan. 1, 1894, Charles L. Flint gave $1,000; in 1887, Elizur Smith of Lee, Mass., gave $1,215. These were the largest bequests, and now amount to | 10,000 00 |
| Endowed labor fund: — Gift of a friend of the college in 1901, income of which is be be used for the assistance of needy and deserving students, | 5,000 00 |
| Whiting Street scholarship: — Gift of Whiting Street of Northampton, for no special purpose, but to be invested and the income used. This fund is now used exclusively for scholarship, | 1,000 00 |

| | |
|---|---|
| Hills fund: — | |
| Gift of Leonard M. and Henry F. Hills of Amherst, Mass., in 1867, to establish and maintain a botanic garden, | $10,000 00 |
| Mary Robinson fund: — | |
| Gift of Miss Mary Robinson of Medfield, in 1874, for scholarship, | 1,000 00 |
| Grinnell prize fund: — | |
| Gift of Hon. Wm. Claflin, to be known as the Grinnell agricultural prize, to be given to the two members of the graduating class who may pass the best oral and written examination in theory and practice of agriculture, given in honor of George B. Grinnell of New York, | 1,000 00 |
| Gassett scholarship fund: — | |
| Gift of Henry Gassett of Boston, the income to be used for scholarship, | 1,000 00 |
| Massachusetts Agricultural College investment fund: — | |
| Investment made by vote of trustees in 1893 to purchase one share of New York Central & Hudson River Railroad stock. The income from this fund has been allowed to accumulate, | 100 00 |
| Danforth Keyes Bangs fund: — | |
| Gift of Louisa A. Baker of Amherst, Mass., April 14, 1909, the income thereof to be used annually in aiding poor, industrious and deserving students to obtain an education in said college, | 6,000 00 |
| John C. Cutter fund: — | |
| Gift of Dr. John C. Cutter of Worcester, Mass., an alumnus of the college, who died in August, 1909, to be invested by the trustees, and the income to be annually used for the purchase of books on hygiene, | 1,000 00 |
| Alvord dairy scholarship fund: — | |
| Gift of Henry E. Alvord, who was the first instructor in military tactics, 1869–71, and a professor of agriculture, 1885–87, at this institution. The income of this fund is to be applied to the support of any worthy student of said college, graduate or post-graduate, who may be making a specialty of the study of dairy husbandry (broadly considered), with the intention of becoming an investigator, teacher or special practitioner in connection with the dairy industry, provided that no benefits arising from such fund shall at any time be applied to any person who then uses tobacco in any form or fermented or spirituous beverages, or is known to have done so within one year next preceding, | 4,000 00 |

William R. Sessions fund: —

In accordance with the request of my deceased wife, Clara Markham Sessions, made in her last will, I bequeath to the trustees of the Massachusetts Agricultural College, Amherst, Mass., the sum of $5,000, it being the amount received by me from the estate of the said Clara Markham Sessions. The said $5,000 to be kept by the said trustees a perpetual fund, the income from which shall be for the use of the Massachusetts Agricultural College; and according to the further request of my deceased wife, made in her last will, this is to be known as the William R. Sessions fund, and is to be a memorial of William R. Sessions; and it is my special request that the said trustees shall make record of the fact that this fund came from the estate of my deceased wife, Clara Markham Sessions, in accordance with her request made in her last will, . . $5,000 00

$49,100 00

## PRIZES.

Animal husbandry. The F. Lothrup Ames prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, to be given to the three students standing highest in the work of advanced live stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago. Given in May, 1912, available first in autumn of 1912, and for the four succeeding years, . . . . $150 00

FRED C. KENNEY,

*Treasurer.*

THE M. A. C. BULLETIN
AMHERST, MASS.

Vol. IX, No. 3 For March, 1917

A Four Weeks' Summer Course

# RECREATION APPLIED TO COUNTRY LIFE PROBLEMS

Given by

The Massachusetts Agricultural College
and
The Northeastern Field Committee
of the
Young Women's Christian Association

AMHERST, MASS.
JULY 2 to 31, 1917

Published Six Times a year by the Massachusetts Agricultural College
Jan., Feb., Mar., May, Sept., Oct.
Entered as Second Class Mail Matter at the Post Office, Amherst, Mass.

# FOREWORD

A survey of the relation of education to the building up of rural community life has revealed that high standards of education are not a guarantee of corresponding moral standards. There is an obvious necessity for a more direct effort to secure wholesome social conditions. This will not happen; it must be planned.

This school has been arranged to make accessible to those dealing with country community problems a broad view of recreational activities suited not only to play as a pastime, but to that more fundamental character building that makes recreation not only valuable but indispensable.

The four courses continue throughout the four weeks, one hour per day being given to each course.

## Course A. Rural Social Problems

Ten lectures as follows: Original social forces that dynamize all human life; mendelism and modern social problems; eugenics and its practical possibilities; poverty, its causes and preventives; crime, its background and preventives; the family, its origin and forms; problems of the modern family; social evils and their control; social reconstruction of modern life; city and country of the future.

Prof. Robert J. Sprague, M.A.C.

Rural Social Life : Analysis, Organization and Leadership.

Prof. Walter J. Campbell,
Director of County Work,
International Y. M. C. A.
College, Springfield.

## Course B. Rural Organization

Club Work for Girls: A study of the fundamental principles of club organization, management and program making. The training of leadership through group work. The relation of club activities to the home.

Miss Anna M. Clark.

Group Study in Homemaking : Prof. Laura Comstock, M.A.C.

Junior Club Work: George L. Farley, M.A.C.

Rural Community Organization: This course is planned to cover a study of the principles and methods involved in practical community building; The Rural Problem; The Community Planning Idea; The Community Survey; The Community Council; The Community Program—what it is, how to get it, how to get results with it.

Prof. E. L. Morgan, M.A.C.

## Course C. Social Morality and Character Standards

Social Morality: A course in the psychology of adolescence with emphasis on recreation as a solution of the sex problem. Social relationships between boys and girls, and moral standards in the community.

Dr. Mabel S. Ulrich.
Special Lecturer on Social Morality
for the National Board, Y. W. C. A.

Health: Two lectures on the bearing of physical conditions on character. Woman's new attitude to health and the new standards of health as factors in social morality.

Dr. Anna L. Brown, Y. W. C. A.

Story Telling: Bible story telling as a means to help girls formulate standards of conduct seven days in the week.

Miss Ethel Cutler, Y. W. C. A.

A series of talks upon the Structure and Methods of Use of the Human Body as a Basis of Heath.

Dr. Joel E. Goldthwait.

## Course D. Organized Play and Recreation

The theory and demonstration of play as a creative force developing social consciousness in the individual and in the group a sense of responsibility for the standards of the community. There will be special emphasis on games for the home and the rural school. Recreation as it affects the whole community will be treated in the lectures and in out-of-door demonstrations.

Dr. Agnes Burns Ferguson.
Assistant Director of
Recreation, Pittsburg, Pa.

## THE REGION SURROUNDING AMHERST—EXCURSIONS

Amherst is one of the most delightful towns in New England, and has long been noted for the natural scenic beauties surrounding it, and as an educational center. It is located in the heart of the Connecticut valley. The Holyoke range, Mt. Tom, Mt. Holyoke, Mt. Toby, the Orient, the Connecticut River, Rattlesnake Gutter, Whately Glen, Old Deerfield and other places of great scenic beauty and historic interest are within easy walking, trolley or driving distance. The Berkshire and Hampshire Hills country is easily accessible.

Amherst is easily accessible from Springfield and Boston.

An opportunity will be given to visit these places of natural beauty and to study the Old Deerfield industries. On these trips camp cooking will be practiced. Those expecting to take the recreation course are requested to bring bloomers, middy-blouses, and rubber shoes.

## REGISTRATION

Those who are expecting to attend this school should register as early as possible. The registration fee for the Summer School is $5.00, payable at the time application is made. Remittance should accompany the application blank, and should be made payable to F. C. Kenney, the college treasurer. Registration fee will be refunded to those who find it impossible to attend the school. Tuition is absolutely free, and there are no incidental charges. A booklet showing the complete courses of the Summer School will be forwarded upon application.

## ROOMS AND BOARD

Rooms will be provided in the college dormitories, and in private houses in close proximity to the college. A uniform rate of $1.25 a week is charged for the dormitory rooms. Rooms outside the college may be had for from $1.50 to $2.50 per person. The college will also supply a limited number of first-class United States army tents for those who wish them. Each tent will accommodate two persons. The charge for these tents will be $1.00 a week per person. Good meals are served at the college dining room on the a la carte basis. Good boarding places may be secured outside the college if desired. For further information, or for summer school bulletins, send to Andrew S. Thomson, in charge of Summer Schools, Amherst, Mass.

# The Massachusetts Agricultural College

## SHORT COURSES

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# SUMMER SCHOOLS
## 1917

AMHERST, MASSACHUSETTS

"THE AMHERST MOVEMENT"

M. A. C. Bulletin

Volume IX MAY, 1917 Number 4

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# THE MASSACHUSETTS AGRICULTURAL COLLEGE
# SUMMER SCHOOLS
# 1917

## The Summer School of Agriculture and Country Life

July 2 to 31

(See Page 7)

## School of Rural Recreation

Given Cooperatively by Northeastern Field Committee
of the Y. W. C. A. and M. A. C.

July 2 to 31

(See Page 23)

## Agricultural Camps

(See Page 26)

| | |
|---|---|
| First Boys' Camp . . . . . | July 2–July 9 (inc.) |
| Second Boys' Camp . . . . | July 11–July 18 (inc.) |
| Third Boys' Camp, for Prize Winners . | July 20–July 27 (inc.) |
| Girls' Camp for Prize Winners . . | July 20–July 27 (inc.) |

## The Poultry Convention

July 25, 26, 27

(See Page 29)

## Conference on Rural Organization

July 31–Aug. 1, 2, 3

(See Page 25)

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**Published six times a year by the MASSACHUSETTS AGRICULTURAL COLLEGE, January, February, March, May, September and October.**

*Entered as second class matter at the Post-office, Amherst, Mass.*

## FACULTY OF THE SUMMER SCHOOLS
## 1917

Kenyon L. Butterfield, A.M., LL.D.
*President of the College*

William D. Hurd, M.Agr.
*Director of The Extension Service and Supervisor of Short Courses*

Andrew S. Thomson, A.M.
*Assistant Professor of Market Gardening*
*In Charge of Summer Schools*

Charles R. Green, B.Agr.
*Librarian of the College*

F. Josephine Hall, A.M.
*Adviser for Women*

| | |
|---|---|
| Laura Elizabeth Bell<br>Director of Physical Education, Amagansett, N. Y. | *Physical Education* |
| Anna L. Brown, M.D.<br>Secretary for Hygiene, National Board, Y. W. C. A. | *Physical Education* |
| John L. Byard<br>Superintendent of Apiary. | *Beekeeping* |
| Walter J. Campbell, M.A.<br>Director of County Work, Y. M. C. A. College. Springfield, Mass. | *Rural Sociology* |
| Anna M. Clark,<br>County Secretary, Northeastern Field Committee, National Board, Y. W. C. A. | *Work with Girls* |
| William D. Clark, A.B., M.F.<br>Professor of Forestry. | *Forestry* |
| Laura Comstock<br>Extension Professor of Home Economics. | *Home Economics* |
| Ethel Cutler,<br>Secretary for Religious Work, National Board, Y. W. C. A. | *Story Telling* |
| George L. Farley, M.Sc.<br>Supervisor, Junior Extension Club Work. | *Boys' and Girls' Clubs* |
| Agnes Burns Ferguson, M.D.<br>Director of Playgrounds, Pittsburg, Pa. | *Organized Play* |
| Burton N. Gates, Ph.D.<br>Associate Professor of Beekeeping. | *Beekeeping* |
| Joel E. Goldthwait, M.D.<br>Physician, Boston, Mass. | *Physical Education* |

## FACULTY OF THE SUMMER SCHOOLS—Continued

| | |
|---|---|
| John C. Graham, B.Sc.<br>Professor of Poultry Husbandry. | *Poultry Husbandry* |
| Ida E. Hall, LL.B.<br>Waltham, Mass. | *Plays and Pageants* |
| Earl Jones, M.Sc.<br>Assistant Professor of Agronomy. | *Soil Fertility* |
| William Chauncy Langdon<br>Pageant Master, M. A. C. 50th Celebration | *Community Drama* |
| Charles J. Maynard<br>Naturalist and Lecturer, West Newton, Mass. | *Ornithology* |
| John C. McNutt, B.Sc.Agr.<br>Professor of Animal Husbandry. | *Animal Husbandry* |
| Ezra L. Morgan, A.M.<br>Extension Professor of Local Community Organization. | *Community Organization* |
| Ethel Nash<br>Extension Instructor in Agricultural Education. | *In Charge of Girls' Camp* |
| William S. Regan, Ph.D.<br>Instructor in Entomology. | *Entomology* |
| Frederick W. Ried<br>Director of Practical Arts, Framingham (Mass.) Normal School. | *Handicrafts* |
| Marie Sayles, B.S.<br>Extension Instructor in Home Economics. | *Home Economics* |
| Fred C. Sears, M.Sc.<br>Professor of Pomology. | *Pomology* |
| F. A. Cushing Smith, B.Sc., M.L.A.<br>Extension Instructor in Civic Improvement. | *Civic Improvement* |
| Robert J. Sprague, Ph.D.<br>Professor of Economics and Sociology. | *Sociology* |
| Mabel S. Ulrich, M.D.<br>Special Lecturer, National Board, Y. W. C. A. | *Physical Education* |
| John T. Wheeler, B.S.<br>Assistant Professor of Horticulture. | *Elementary Agriculture* |
| James Whiting<br>Head Gardener, Department of Floriculture. | *Floriculture* |

## COMMITTEES OF THE FACULTY OF THE SUMMER SCHOOL OF AGRICULTURE AND COUNTRY LIFE

### Course of Study

PROFESSORS GRAHAM, JONES and THOMSON

### Excursions

PROFESSORS THOMSON, SEARS and WHEELER

### Social Evenings

PROFESSOR THOMSON, MISS F. JOSEPHINE HALL and MR. RIED

So far as possible, the members of the faculty of the Summer Schools are selected from the regular faculty of the College. Where instructors are engaged from other institutions, great care is taken to secure men and women eminent in their respective lines of work.

**Monday, July 2.** Registration and assignment of rooms for Summer School of Agriculture and Country Life and Four Weeks' Course in Rural Recreation and Health. First Boys' Camp begins.

**July 3.** Classes begin.
Afternoon, 3:00–5:00, Demonstration of Organized Play and Recreation, on Campus.
Evening, 7:00–8:00, Informal Reception to Summer School Students.
8:00–10:00, Social Evening, Drill Hall.

**July 4.** Amherst Community Fourth of July Celebration; Summer School participates in the Program.

**July 5.** Afternoon, 3:00–5:00, Demonstration of Organized Play and Recreation, on Campus.
Evening, 8:00, Lecture: Pageants and Their Meaning. William Chauncy Langdon, Pageant Master, 50th Anniversary of M. A. C.

**July 6.** Afternoon, 3:00, Seminar: The State-and Nation-Wide Extension Work Movement. Leader, Director William D. Hurd.
Afternoon class excursions.
Evening, 8:00–11:00, Social Evening, Drill Hall.

**July 7.** Excursion: to Mt. Holyoke College, Paper or Silk Mills and Mt. Tom.

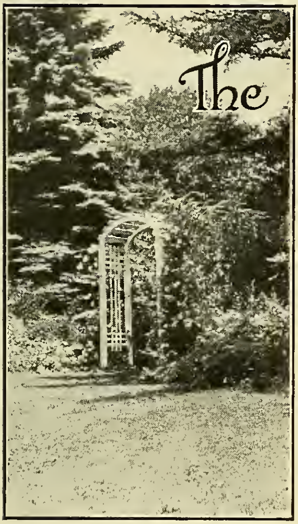
**Monday, July 9.** Afternoon, 3:00, Seminar: Boys' and Girls' Agricultural and Home Economics Clubs. George L. Farley, Supervisor of Junior Extension Club Work.
Afternoon class excursions.

**July 10.** Afternoon, 3:00–5:00, Demonstration of Organized Play and Recreation, on Campus.
Evening, 8:00–10:00, Social Evening, Drill Hall.

| | |
|---|---|
| **July 11.** | Second Boys' Camp begins.<br>Afternoon excursion: to Mt. Sugar Loaf; Picnic Supper. |
| **July 12.** | Afternoon, 3:00–5:00, Demonstration of Organized Play and Recreation, on Campus.<br>Evening, 8:00. Lecture: Some Intimate Glimpses of our Native Birds. (Illustrated). Edward Howe Forbush, Massachusetts State Ornithologist. |
| **July 13.** | Afternoon class excursions.<br>Evening, 8:00–11:00, Social Evening, Drill Hall. |
| **July 14.** | Classes in forenoon.<br>Excursion and all-night camp on Mt. Toby. |
| **Monday, July 16.** | Afternoon, 3:00, Seminar; Rural Social Problems, Leader, Dr. Robert Sprague.<br>Afternoon class excursions. |
| **July 17.** | Afternoon, 3:00–5:00, Demonstration of Organized Play and Recreation, on Campus.<br>Evening, 8:00–10:00, Social Evening, Drill Hall. |
| **July 18.** | Afternoon excursion; the Holyoke Range and Prospect House, Mt. Holyoke.<br>Second Boys' Camp ends. |
| **July 19.** | Afternoon, 3:00–5:00, Organized Play.<br>Evening, 8:00, Lecture: Preparedness from a Medical Standpoint, Dr. Joel E. Goldthwait. |
| **July 20.** | Boys' Camp for prize winners begins.<br>Girls' Camp for prize winners begins.<br>Afternoon class excursions.<br>Afternoon, 3:00, Seminar; Rural Leadership, Professor Walter Campbell, Leader.<br>Evening, 8:00–11:00, Social Evening, Drill Hall. |
| **July 21.** | All-day excursion: to "Old Deerfield." |
| **Monday, July 23.** | Afternoon, 3:00, Seminar; Organizing a Community for Results. Leader, Professor E. L. Morgan.<br>Afternoon class excursions. |
| **July 24.** | Afternoon, 3:00–5:00, Demonstration of Organized Play and Recreation, on Campus.<br>Evening, 8:00–10:00, Social Evening, Drill Hall. |
| **July 25.** | Poultry Convention begins.<br>Afternoon excursion: Orient Springs, Picnic Supper. |
| **July 26.** | Afternoon, 3:00–5:00, Demonstration of Organized Play and Recreation, on Campus.<br>Evening, 8:00, Lecture. (To be announced.) |
| **July 27.** | All-day excursion. (Place to be announced.)<br>Poultry Convention ends.<br>Boys' and Girls' Camps for prize winners end. |
| **July 31.** | Summer School ends at 12 M.<br>Conference on Rural Organization begins at 2:00 P.M. |
| **Aug. 3.** | Conference on Rural Organization ends. |

# SUMMER SCHOOL OF AGRICULTURE AND COUNTRY LIFE

## ANNOUNCEMENT



The Summer School of Agriculture and Country Life of the Massachusetts Agricultural College will open July 2, for a term of four weeks, closing July 31. This will be the tenth session of the Summer School. The experience of the past nine years will aid in making material improvements in the session of 1917. The work of the Summer School was designed originally for school teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture who can come to the college conveniently during the summer season. Practical courses will be offered for the benefit of such persons also. The courses offered for the current year may be grouped as follows:

1. Courses in practical agriculture and horticulture.
2. Courses in elementary sciences bearing on agriculture and horticulture.
3. Courses in rural sociology.
4. Courses in play and recreation.
5. Courses in domestic economy and household science.
6. Courses arranged especially for rural and village school teachers.
7. Courses for Y. W. C. A. workers.

From these courses it will be possible to make up programs of work especially suitable to the needs of school teachers, principals, superintendents, school committeemen, farm owners, suburban residents, clergymen, social workers, and those who have only a general interest in agriculture. Persons who are in doubt as to what courses will best suit their needs should correspond with Professor Andrew S. Thomson, in charge of Summer Schools, who will gladly advise in all such matters. No course will be given unless elected by five or more students.

## COURSES

## GROUP A

## GENERAL AGRICULTURE, ANIMAL HUSBANDRY, DAIRYING

### 1. Soil Fertility. *Professor Jones*

A systematic study of the factors governing crop production. This course includes a field study of soils of different formations and different textures; a study of tillage, tillage methods, and tillage implements; a study of soil fertility as affected by crop rotations and green manures; and of the economical use of manures, lime and commercial fertilizer. A large part of the work consists of field exercises. Five exercises a week; four weeks.

### 2. Breeds and Livestock Judging. *Professor McNutt*

As detailed a study as is possible of the different breeds and types of farm animals. The characteristics of draft, coach, roadster and saddle horses are studied with a brief review of the several breeds adapted to each class. The history, characteristics and adaptations of the leading dairy and beef breeds of cattle are discussed. Feeding, especially of dairy cattle for economic milk production and care and management consistent with the successful growing of live stock, receive attention. Time is given to the judging of horses and dairy cattle. The work is made practical throughout. Five exercises a week; four weeks.

### 3. Poultry Breeding and Management. *Professor Graham*

This covers: poultry house construction; incubation and brooding; care of poultry in summer; winter egg production; marketing eggs and poultry; poultry diseases. Laboratory work consists of caring for incubators and brooders and managing young chicks, killing, picking, dressing and caponizing. As much practical work as possible is given; this includes poultry carpentry, caring for breeders and layers, also some elementary work in judging. Four lectures and one laboratory period a week; four weeks.

## GROUP B
## HORTICULTURE, FORESTRY, LANDSCAPE GARDENING

*A Demonstration of Spraying Apparatus*

### 8. Fruit Growing.

*Professor Sears*

A study of modern methods of propagating, planting, cultivating, pruning, fertilizing, and spraying fruit trees; planning and managing orchards; selling fruit. Lectures, demonstrations and field exercises. Five exercises a week; four weeks.

### 9. Vegetable Gardening.

*Professor Thomson*

This course consists almost wholly of practical field exercises in planting, training and cultivating vegetables, and while no special effort is made to put the work into common school form, the exercises are especially valuable to school garden teachers. Limited to twenty-five pupils. Two lectures and three laboratory exercises a week; four weeks.

**10. Amateur Home and Flower Gardening.** *Mr. Whiting*

Covers the growing of flowers for the home garden or school garden without the use of greenhouses. The course is designed to familiarize the student with *what to do, how to do it, and when,* in order to have a supply of flowers for the home. The course will include a discussion of soils, fertilizers, insects and preventives, propagation of annuals, perennials, and bedding plants by seeds, cuttings and division. Culture of bulbs. Planting and care of the garden. Two lectures and three two-hour demonstration periods a week; four weeks.

**11. Forestry.** *Professor Clark*

Short trips will be made to identify and study the habits of growth of our native and commonly introduced species of trees. These trips will be alternated with lectures on tree growth, tree planting, wood-lot management and general silviculture. Five exercises a week; four weeks.

**12. Civic Improvement.** *Mr. Smith*

Instruction as to how best to organize and carry on civic betterment; the technical problems involved, the principles on which they are to be solved, with special reference to rural conditions. Five exercises a week; last two weeks.

*Class in Civic Improvement*

## GROUP C
## SCIENCES RELATED TO AGRICULTURE

**13. Bird Life.** *Mr. Maynard*

A first-hand study of the local bird fauna, conducted largely in the field. Special attention is given to economic relations of the birds and to nesting habits. In addition to daily lectures on birds, walks will be taken each afternoon for field observation and study of songs, habits, etc. Five exercises a week; four weeks.

**14. Insect Life.** *Dr. Regan*

An introductory course which has been arranged with particular reference to the needs of teachers in grade schools and high schools who are expected to treat of insects in their classes, either as a part of nature study or in their relation to agriculture. The course is also planned for persons, not teachers, who wish a general knowledge of insect pests and methods of control. A part of the time is spent in the field, studying living insects, their habits, the injuries they cause, and their identification. Five exercises a week; four weeks.

*Clark Hall*

**15. Beekeeping.** *Professor Gates and Mr. Byard*

This course is designed particularly for school teachers or beginners in the subject. Comprises the elementary and practical features of the beekeeping industry, including equipment, handling and manipulation of bees, essential apparatus, a discussion of the diseases and races of the honey bee, the utilization of bees as nature study material in the lecture and schoolroom, as well as for pleasure. Five lectures and such laboratory periods as can be arranged each week; last two weeks.

## GROUP D
## HOME ECONOMICS, PRACTICAL ARTS

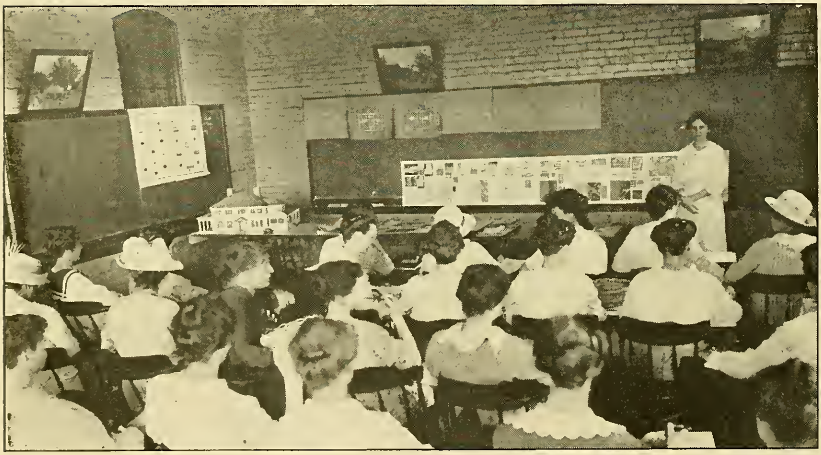
**16. Foods and House Construction.**

*Professor Comstock and Miss Sayles*

A definite study outlining the several food principles governing normal and special diets. The planning of menus, cost of materials and their preparation are discussed during the first two weeks. Lectures are given on house construction and remodeling, sanitation and decoration during the second two weeks. Demonstrations are given in the preparation and serving of milk, eggs, cheese, cereals, beverages, vegetables, canning fruits and vegetables, meats, bread, baking powder mixtures, salads, desserts. Three lectures and two demonstrations a week; four weeks.

**17. Household Management.** *Professor Comstock*

This course deals with the general organization of the household and treats of such specific problems as budget making, household accounts, labor-saving devices and general scheme of work. Special readings will be required. Five hours a week; four weeks.



*Class in Home Economics*

**18. Sewing.** *Miss Sayles*

This course is offered for two purposes: (1) to enable teachers to adapt sewing to the needs of the rural school; (2) for practice in home sewing. The course consists of work in the use of the principal stitches applied directly to the making of articles; selection of fabrics; simple household tests to detect adulterations in fabrics; pattern cutting and adjustment; and the care and repairing of clothing. Five exercises a week; four weeks.

**19. Design and Practical Arts. (1).** *Mr. Ried*

Lectures and laboratory work developing the value of design as a rural school asset. Work in binding and its various problems, basketry, elementary weaving, thin and thick cardboard construction, leather work, bagging projects and rural dyeing; also other phases of rural pre-vocational subject matter, also rural avocational craft-work. Those taking this work should bring 9″ x 12″ drawing paper, carbon paper, scissors, ruler, eraser, knife and pencils. Five exercises a week; four weeks.

**20. Practical Arts (2).** *Mr. Ried*

An interpretation of the new state course in drawing and handwork with laboratory periods. This course has been especially outlined for country schools and has already made radical changes in school arts. Given if ten or more call for it. Class limited to twenty. Five exercises a week; four weeks.

**21. Organized Play and Recreation.** *Dr. Ferguson and Miss Bell*

The theory and demonstration of play as a creative force developing in the individual social consciousness and in the group individual responsibility for standards of living in the home and the community. There will be special emphasis on games for the home and the rural school. Methods of organizing and directing

*Organized Play and Recreation*

games, athletics, etc. Demonstrations form a prominent feature of the work. Three lectures and four afternoon demonstrations a week; four weeks.

**22. Community Drama.** *Mr. Langdon*

Lectures on the Pageant and the whole field of the new Community Drama, differentiating between some of the forms such as the Pageant, the Masque, the Out-door Drama, the Festival, and the School-Play, illustrated by readings from pageants and by slides, and looking forward to the Pageant for the 50th Anniversary of the Massachusetts Agricultural College in October. Five lectures a week; first two weeks.

**23. Plays and Pageantry.** *Miss Ida Hall*

A course to meet the demand of teachers and social workers for simple methods of applying dramatic principles to school and neighborhood work. Opportunities to present short dramas will be offered to members of this class. Five exercises a week; last two weeks.

## GROUP F

## ELEMENTARY AGRICULTURE FOR TEACHERS

**24. Elementary Agriculture.** *Professor Wheeler*

This course is designed primarily to meet the needs of teachers, school officers, and others who are interested in making agricultural instruction in our public schools function directly in personal and community life. The laboratory work and closely correlated lectures cover the most important aspects of agriculture, and special emphasis is placed upon materials and methods of presentation. Five periods a week; four weeks.

## GROUP G

## RURAL HEALTH AND RECREATION

(See courses listed under "Four Week's Summer Course—Recreation Applied to Country Life Problems"—Page 23.)

## SEMINARS

In order that those who attend the Summer School may obtain some idea of present-day organized movements in agriculture the following Seminars have been arranged. These will be held between the hours of 3:00 and 5:00 on the days mentioned, and, weather permitting, will be held in the open air. The Seminars are open to the public as well as to Summer School students.

**July 6.** "The State- and Nation-Wide Extension Work Movement." Leader, Director William D. Hurd.

**July 9.** "Boys' and Girls' Agricultural and Home Economics Clubs." George L. Farley, Supervisor, Junior Extension Club Work.

**July 16.** "Rural Social Problems." Robert J. Sprague, Professor of Economics and Sociolgy.

**July 20.** "Rural Leadership." Walter J. Campbell, Director of County Work, Y. M. C. A. College, Springfield.

**July 23.** "Organizing a Community for Results." E. L. Morgan, Extension Professor of Local Community Organization.

## GENERAL PLAN OF THE SUMMER SCHOOL WORK

The formal instruction in the Summer School is given in definite courses herein described. From these each pupil may elect schedules of not less than ten nor more than fifteen exercises a week, unless a larger or smaller amount of work is especially allowed by the supervisor. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises are frequently arranged. These are arranged by instructors in the different courses. Excursions are arranged for every Wednesday afternoon, and more extended excursions for the whole school are planned for every Saturday. All excursions are in charge of an instructor.

*1916 Summer School Group*

Round table and special discussions are arranged by various instructors as their courses require.

(*Continued on page 18*)

## Summer School

| | 8.25—9.15 | 9.25—10.15 |
|---|---|---|
| Monday | 1 Soil Fertility 4 weeks<br>5 Poultry 4 weeks<br>10 Floriculture (Laboratory) 4 weeks<br>16 Insect Life 4 weeks<br>18 Foods and House Construction 4 weeks<br>23 Organized Play 4 weeks<br>26 Elementary Agriculture 4 weeks | 2 Breeds and Stock Judging 4 weeks<br>8 Fruit Growing 4 weeks<br>10 Floriculture (Laboratory) 4 weeks<br>24 Community Drama First 2 weeks<br>25 Plays and Pageantry Last 2 weeks<br>28 Rural Organization 4 weeks |
| Tuesday | 1 Soil Fertility<br>5 Poultry<br>10 Floriculture<br>16 Insect Life<br>18 Foods and House Construction (Laboratory)<br>26 Elementary Agriculture (Laboratory) | 2 Breeds and Stock Judging<br>8 Fruit Growing<br>18 Foods and House Construction (Laboratory)<br>24 Community Drama<br>25 Plays and Pageantry<br>28 Rural Organization |
| Wednesday | 1 Soil Fertility<br>5 Poultry<br>10 Floriculture (Laboratory)<br>16 Insect Life<br>18 Foods and House Construction<br>23 Organized Play<br>26 Elementary Agriculture | 2 Breeds and Stock Judging<br>8 Fruit Growing<br>10 Floriculture (Laboratory)<br>24 Community Drama<br>25 Plays and Pageantry<br>28 Rural Organization |
| Thursday | 1 Soil Fertility<br>5 Poultry<br>10 Floriculture<br>16 Insect Life<br>18 Foods and House Construction (Laboratory)<br>26 Elementary Agriculture (Laboratory) | 2 Breeds and Stock Judging<br>8 Fruit Growing<br>18 Foods and House Construction (Laboratory)<br>24 Community Drama<br>26 Plays and Pageantry |
| Friday | 1 Soil Fertility<br>5 Poultry<br>10 Floriculture (Laboratory)<br>16 Insect Life<br>18 Foods and House Construction<br>23 Organized Play<br>26 Elementary Agriculture | 2 Breeds and Stock Judging<br>8 Fruit Growing<br>24 Community Drama<br>25 Plays and Pageantry<br>28 Rural Organization<br>10 Floriculture (Laboratory) |
| Saturday | Forenoon classes will be held on Saturday, July 14.<br>All-day excursions on other Saturdays. | |

# Schedule 1917

| 10.25—11.15 | 11.25—12.15 | Afternoon and Evening |
|---|---|---|
| Vegetable Gardening (Laboratory) 4 weeks<br>Civic Improvement Last 2 weeks<br>Household Administration 4 weeks<br>Design and Practical Arts (1) 4 weeks<br>Rural Social Problems 4 weeks | 9 Vegetable Gardening (Laboratory) 4 weeks<br>11 Forestry 4 weeks<br>15 Bird Life 4 weeks<br>17 Beekeeping Last 2 weeks<br>19 Sewing 4 weeks<br>22 Design and Practical Arts (2) 4 weeks<br>29 Social Morality 4 weeks | Class Excursions<br>Seminars |
| Vegetable Gardening<br>Civic Improvement<br>Household Administration<br>Design and Practical Arts (1)<br>Rural Social Problems | 11 Forestry<br>15 Bird Life<br>17 Beekeeping<br>19 Sewing<br>22 Design and Practical Arts (2)<br>29 Social Morality | 3.00—Organized Play and Recreation<br>8.00–10.00—Social Evening |
| Vegetable Gardening (Laboratory)<br>Civic Improvement<br>Household Administration<br>Design and Practical Arts (1)<br>Rural Social Problems | 9 Vegetable Gardening (Laboratory)<br>11 Forestry<br>15 Bird Life<br>17 Beekeeping<br>19 Sewing<br>22 Design and Practical Arts (2)<br>29 Social Morality | Regular Mid-Week Excursion |
| Vegetable Gardening<br>Civic Improvement<br>Household Administration<br>Design and Practical Arts (1)<br>Rural Social Problems | 11 Forestry<br>15 Bird Life<br>17 Beekeeping<br>19 Sewing<br>22 Design and Practical Arts (2)<br>29 Social Morality | 3.00—Organized Play and Recreation<br>7.30 Regular Evening Lecture |
| Vegetable Gardening (Laboratory)<br>Civic Improvement<br>Household Administration<br>Design and Practical Arts (1)<br>Rural Social Problems | 9 Vegetable Gardening (Laboratory)<br>11 Forestry<br>15 Bird Life<br>17 Beekeeping<br>19 Sewing<br>22 Design and Practical Arts (2)<br>29 Social Morality | Class Excursions<br>Seminars<br>8.00–11.00—Social Evening |

## "THE AMHERST MOVEMENT"

The management of the Summer School provides at least one evening lecture each week. These lectures are usually given on Thursday evening by men of national repute and deal with practical, social and economic subjects related to rural life. Everyone is cordially invited.

One or two social evenings are arranged for each week. These social evenings are under the direction of a committee of the faculty, working with the Summer School students. These events together with evening lectures, the regularly scheduled Wednesday and Saturday excursions, the afternoon field trips for study, make life at the Summer School extremely enjoyable as well as profitable.

## COLLEGE EQUIPMENT

The Massachusetts Agricultural College is maintained by the Federal government and by the State of Massachusetts for teaching and investigation in agriculture in the broadest sense. The College has over 700 acres of land most of which is in a high state of cultivation and illustrates most of the leading agricultural industries of Massachusetts. There is a large range of greenhouses of the most modern and approved type; there is a modern dairy barn with dairy cattle; there are good horses, pure-bred swine, sheep and poultry; there are fields of corn, potatoes, clover and grass in season; orchards of apple, peach, plum and pear trees; tracts of good forest land, nurseries and market gardens; in addition, a good school garden, maintained cooperatively by the College and the Amherst schools, will be in operation. There are also considerable tracts devoted to experiments, many of which are of unusual interest. Then there are well-equipped departments of botany, entomology and chemistry, dealing in the most thorough manner with these special sciences. All of this equipment (much more than can be described or even named) is placed at the service of the Summer Schools.

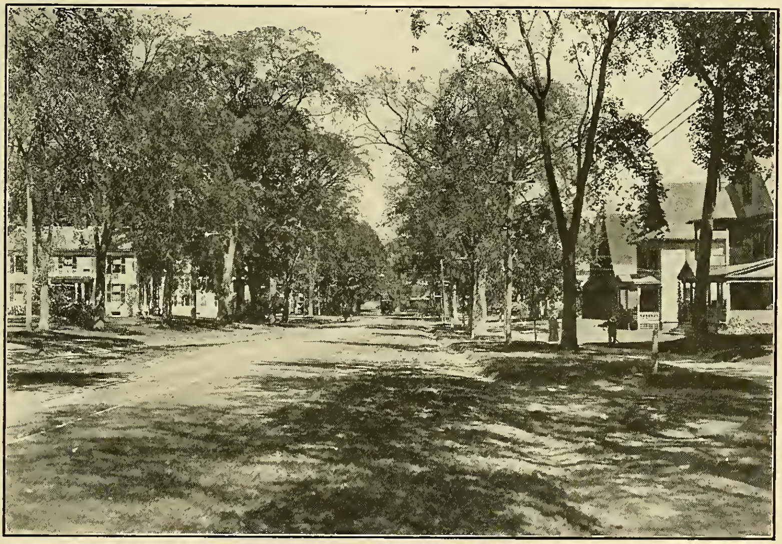
## THE LIBRARY

The college library occupies the entire lower floor of the Chapel building and contains over 50,000 volumes in addition to a large number of pamphlets. The library ranks extremely well with the agricultural libraries of the country. Summer School students are able to find splendid material in every line of college work, especially in agriculture, horticulture, botany, entomology, and sociology. The reading room is provided with a variety of magazines, encyclopedias, and reference books, in addition to the newspapers and agricultural weeklies.

The library hours are from eight a. m. to twelve m. and from one to five p. m. every week day, and from nine a. m. to two p. m. on Sundays. The librarian and his assistants are constantly on hand, ready and willing to be of assistance to Summer School students.

## ELECTION OF COURSES

Election of courses should be made at the time of registration. Every election is subject to the approval of the supervisor and of the instructor whose course is elected. As it is necessary to schedule several courses against each other, certain combinations of courses are made unavailable. It should be specially noticed that certain courses are offered to a limited number of pupils only, and as a rule pupils are accepted in these courses in the order of application. Each pupil should choose such combinations of courses as will keep two or three subjects in hand at the same time. This will meet the requirement that each one must take at least ten and not more than fifteen exercises a week, unless permitted to take more or less by special order of the supervisor. See Schedule of Courses and hours at which they come on pages 16 and 17.



*An Amherst View*

## GROUPING OF COURSES

Those desiring work in general agriculture and animal husbandry should elect from courses Nos. 1, 2,

Those desiring work in horticulture and forestry should elect from courses, Nos. 1, 8, 9, 10, 11, 12, 16, 17.

Those wishing to make desirable combinations of the home economics courses should elect from Nos. 18, 19, 20, 21, 22.

Those desiring to train themselves for supervising playgrounds and gardens from Nos. 1, 9, 10, 12, 23, 24, 25, 26, 29, 34.

Those interested in high school science should elect from Nos. 1, 8, 9, 15, 16, 17, 21, 22, 33.

Those interested in rural social work such as Y. W. C. A. work should elect from courses Nos. 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.

## REGISTRATION, ATTENDANCE, ETC.

Those who expect to attend should register as early as possible. **Registration fee for the Summer School is $5, payable at the time application is made.** Remittance should accompany application blank and should be made payable to the College Treasurer. A Summer School registration blank will be found in the back part of this bulletin. Registration fees will be refunded to those who find it impossible to attend the school.

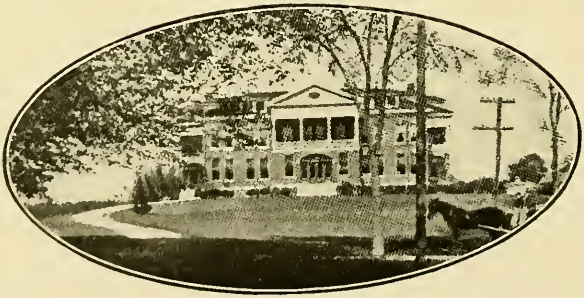
Attendance is required in the courses elected. Some sort of examination, test or permanent note book will be required in each course. Those who complete at least three courses in a satisfactory manner, including practically perfect attendance, will be given a statement showing work accomplished at the close of the term.

There are no rules or regulations. This absence of rules has worked admirably in the past, and it gives everyone a sense of freedom based on personal responsibility, the basis of all proper government, whether in school, college or the community.

**Tuition is absolutely free,** and there are no incidental charges. The College is supported by the State and the Federal governments, and receives no payments whatever from Summer School pupils except for room, board, and the registration fee.

## ROOMS, BOARD, ETC.

Rooms will be provided in the College dormitories and in private homes adjoining the College grounds. In general, the dormitory



*Dining Hall, M. A. C.*

rooms are in suites of two bedrooms, opening into one study room; the bedrooms are furnished with single beds. These rooms are located in two dormitories known as North College and South College and are reserved for women students exclusively. The toilet and bathrooms are in the basements; water is not provided in the rooms. While the appointments in general are not those of a high-priced summer hotel, they are sanitary and comfortable, and have been found pleasant by men students for many years and by the women students of the Summer School during the summer. A uniform rate of $1.25 a week for each person will be charged for these rooms, and each pupil will be expected to supply her own blankets, sheets, pillow cases, towels, etc. Convenient arrangements for laundry work may be made in Amherst.

**All requests for dormitory rooms must be made to, and rooms will be assigned by, the College Treasurer. A deposit of $2.00 is required in order to have a room in a dormitory reserved. This deposit is not refunded to those who find it impossible to attend.**

The College will also supply a limited number of first-class United States army wall tents for those who wish them. Each tent will accommodate two persons. The tents will be placed in a pleasant and convenient location on the College campus, and every reasonable provision will be made for the comfort of the occupants. This form of domicile has been found very acceptable in other summer schools, chautauquas and camps. Those who care for real outdoor life at its best will find these arrangements genuinely enjoyable. The charge for these tents will be $1.25 a week for each person.

Rooms outside the College vary considerably in their accommodations and somewhat in price, the charge ranging from $2.00 to $3.00 a week for each person. **A list of available rooms in the village will be furnished Summer School students at the time of registration. Every effort will be made by those in charge to see that everyone has comfortable accommodations.**

A few furnished houses are usually available in Amherst during July and August at reasonable rentals.

Meals are served in Draper Hall on the College grounds on the a la carte basis, ranging from $4.00 to $6.00 per week. The College also maintains a cafeteria on self-service plan. Good boarding places can also be secured outside of the College if desired.

## ATHLETICS AND RECREATION

Athletics and sports of various kinds occupy a prominent place in the Summer School. Tennis tournaments for both men and women are held and baseball teams are organized. Contests with teams from nearby towns are held, subject to the approval of the proper committee. This year, under competent supervision, demonstrations of organized play, recreation, folk dancing, and so forth will be given. Late afternoon and early evening periods will be used for this purpose.

The region around Amherst is especially rich in attractive places for tramping, excursions and picnics. The management of the Summer School usually arranges a suitable amount of this form of recreation.

(**For Summer School application blank see last page of bulletin.**)

(**For Schedule see pages 16 and 17.**)

## “THE AMHERST MOVEMENT”

### A Four Weeks’ Summer Course

# RECREATION APPLIED TO COUNTRY LIFE PROBLEMS

Given by
The Massachusetts Agricultural College
and
The Northeastern Field Committee
of the
Young Women’s Christian Association
July 2 to 31, 1917

## FOREWORD

A survey of the relation of education to the building up of rural community life has revealed that high standards of education are not a guarantee of corresponding moral standards. There is an obvious necessity for a more direct effort to secure wholesome social conditions. This will not happen; it must be planned.

This school has been arranged to make accessible to those dealing with country community problems a broad view of recreational activities suited not only to play as a pastime, but to that more fundamental character building that makes recreation not only valuable but indispensable.

The four courses continue throughout the four weeks, one hour per day being given to each course.

### 27. Rural Social Problems.

Ten lectures as follows: Original social forces that dynamize all human life; Mendelism and modern social problems; eugenics and its practical possibilities; poverty, its causes and preventives; crime, its background and preventives; the family, its origin and forms; problems of the modern family; social evils and their control; social reconstruction of modern life; city and country of the future.

Professor Sprague

Rural Social Life: Analysis, Organization and Leadership.

Professor Campbell

### 28. Rural Organization.

Club Work for Girls: A study of the fundamental principles of club organization, management and program making. The training of leadership through group work. The relation of club activities to the home.

Miss Clark

Group Study in Homemaking: Professor Comstock

Junior Extension Club Work: Mr. Farley

Rural Community Organization: This course is planned to cover a study of the principles and methods involved in practical community building; The Rural Problem; The Community Planning Idea; The Community Survey; The Community Council; The Community Program—what it is, how to get it, how to get results with it. Professor Morgan

### 29. Social Morality and Character Standards.

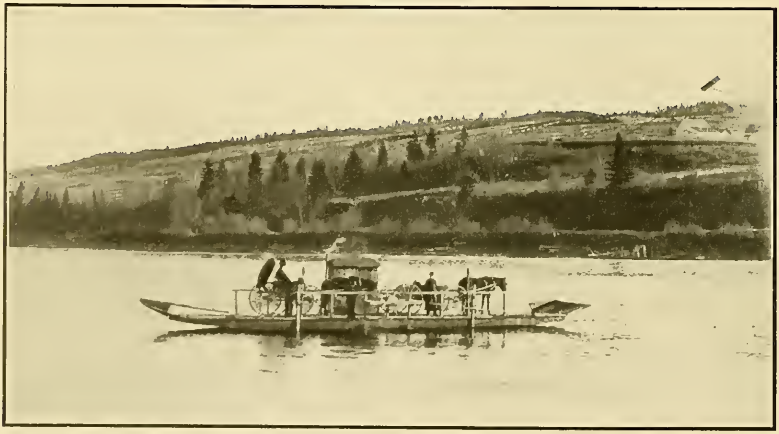
Social Morality: A course in the psychology of adolescence with emphasis on recreation as a solution of the sex problem. Social relationships between boys and girls, and moral standards in the community. Dr. Ulrich

Health: Two lectures on the bearing of physical conditions on character. Woman's new attitude to health and the new standards of health as factors in social morality. Dr. Brown

Story Telling: Bible story telling as a means to help girls formulate standards of conduct seven days in the week.
Miss Cutler

A series of talks upon the Structure and Methods of Use of the Human Body as a Basis of Health. Dr. Goldthwait

### 30. Organized Play and Recreation. (See Course 23.)



*A Survival of a Primitive Method of Transportation across the Connecticut River*

# THE CONFERENCE ON RURAL ORGANIZATION

JULY 31 TO AUG. 3, Inclusive

The Conference on Rural Organization which has been held for the past seven years as a closing feature of the Summer School will take place as usual under the auspices of the following organizations and others:

The Massachusetts Agricultural College
The Massachusetts Federation of Churches
The Massachusetts State Board of Education
The Massachusetts Civic League
The Free Public Library Commission
The State Board of Health
The New England Home Economics Association
The Massachusetts State Grange
The Massachusetts Federation of Women's Clubs
The Massachusetts Anti-Tuberculosis League
The Massachusetts Society for the Prevention of Cruelty to Children
The Massachusetts Branch, National Congress of Mothers and Parent-Teachers' Association

Sectional group conferences take up specific subjects each morning. The afternoons are given up entirely to special and general conferences on what seem to be the most important subjects in our rural life, demonstrations of organized play, recreation, etc. The evenings are given over to music and lectures by eminent students of rural sociology, economics and education.

**Conservation** will be the keynote of the Conference.

The first day will be devoted to actual achievements in Massachusetts towns; the second day to the conservation problem; the third day to our conservation forces and the fourth day to state, county and town conservation programs.

The object of this conference is to acquaint those who are leaders in their respective communities with the work that is going on, not only in Massachusetts, but in New England and other parts of the world, and to give them renewed inspiration and enthusiasm for larger and more intelligent efforts at this time of special national stress.

Teachers, clergymen, grange officers, librarians, county Y. M. C. A. and Y. W. C. A. workers, town officers, boards of health, officers of village improvement societies, Parent-Teachers' associations, homemakers, school officers and all others interested in rural progress, are cordially invited to attend this Conference. The expenses for board and room are low.

A complete program will be published June 1st and can be had by making application to E. L. MORGAN, In Charge of Conference, M. A. C., Amherst, Mass.

## AGRICULTURAL CAMPS

### JULY 2 to 27, 1917

### ANNOUNCEMENT

During the month of July, 1917, the Massachusetts Agricultural College will conduct three agricultural camps for boys and one for girls in connection with the regular Summer School of Agriculture and Country Life. Each camp will be of one week's duration. The College feels it has a direct duty to the boys of the state whose inclinations draw them toward agricultural pursuits. In addition to instruction along agricultural lines there will be a well balanced program of instruction in some of the vital problems of life, and periods will be devoted to athletics and other forms of recreation as shown in the tentative outline of a day's activities. The main purpose of these camps is fourfold:

1. To interest the boy in agriculture and country life. This is the primary object.
2. To impress on the boy his responsibilities as a member of society.
3. To teach the boy clean, wholesome sports, recreation, and proper spirit in competitive contests.
4. To demonstrate the value of a Boys' Camp as an educational factor.

### DATES OF THE CAMPS

**First Camp.**—July 2 to July 9, inc. Registration closes June 21.
**Second Camp.**—July 11 to July 18, inc. Registration closes July 2.
**Third Camp.**—July 20 to July 27, inc.

Note.—Those boys who were in the 1915 or 1916 Camps may register for the second camp only.

Only Agricultural Club prize winners will be admitted to the third camp.

The special camp for the girl winners in club work will also be held July 20 to 27.

### ORGANIZATION OF THE CAMP

#### Selection of Boys

The selection of boys who are to receive the advantages of these camps will be left to the individuals in various organizations which may be interested. Granges, Y. M. C. A.'s, Churches, Clergymen, Scout Masters, Superintendents and Teachers are urged to select boys who might be benefited by a week of this kind, and to see that they are provided with necessary means in order to attend.

Each camp will be limited to fifty boys.

Boys between the ages of 12 and 17 years only will be admitted to the first and second camps.

### Discipline

The camps will be under military discipline. Only those boys who are willing to conduct themselves in the proper manner and observe the rights and comforts of others are invited to join the camps. All members of the camps are required to attend and participate in all meetings on the schedule unless prevented by illness.

There are only a few definite rules in connection with the camps.

1. There shall be no firearms in camp.
2. There shall be no smoking.
3. No camper is allowed to leave the college campus without permission.
4. A gentleman always.

### Expenses

Eight dollars will be charged each boy for the week. This registration fee is used primarily for board, to help defray the cost of maintaining the camp and of instruction and supervision.

## LOCATION OF THE CAMP

The camp is situated on the M. A. C. campus just south of the College Armory. The boys sleep in a large tent 40 by 70 feet, made

*One of the Boys' Camp groups*

of army duck. Each boy is provided with a spring wire cot. These cots are grouped into units of six, designated as "tents" and a leader is selected for each.

A smaller tent is used for the commandant's office. The medical outfit of the physical director's office is readily accessible.

Meals are obtained at the College Dining Hall.

## TENTATIVE PROGRAM OF A DAY AT "BOYS' CAMPS"

| | |
|---|---|
| 6.00 A.M. | "Reveille"—Setting up exercises, shower baths, dress. |
| 7.00 A.M. | Flag Raising. |
| 7.15 A.M. | Breakfast—Announcements for the day. |
| 8.00 A.M. | Camp Duties—"picking up." |
| 8.20 A.M. | Agricultural Lesson. |
| 10.00 A.M. | "Prepare for Inspection"—Make beds. |
| 10.20 A.M. | Morning Talk. |
| 12.00 M. | Tent Inspection. |
| 12.30 P.M. | Dinner. |
| 1.00 P.M. | "Quiet Hour"—Rest in tent, read, write letters home, study in library. |
| 2.00 P.M. | Games and Recreation—Tennis, baseball, track, swims. |
| 4.30 P.M. | Afternoon Specialties—Basketry, surveying, photography, stock judging, etc. |
| 6.00 P.M. | Supper. |
| 6.45 P.M. | "Colors." |
| 7.00 P.M. | Evening Specialty—Games, wig-wagging, "Weather-man," rope-tying, etc. |
| 7.30 P.M. | Evening Lecture or Open Night—Campfire, roasts, vaudevilles, etc. |
| 9.15 P.M. | "Tattoo"—Everybody in tents.—"Camp Newspaper." |
| 9.30 P.M. | "Taps"—Lights out. |

## THE POULTRY CONVENTION

JULY 25, 26 and 27

Preparation is now being made for our Fifth Annual Poultry Convention. It is being developed along such lines as to make it of greatest interest and value to all interested in poultry keeping. There will be three full days of lectures and demonstrations with special features in the evenings. Men and women who have specialized along various lines and have national reputations as successful poultry keepers will be on the program. The Convention will be a clearing house for the latest and best in poultry-keeping information. If you are interested in poultry you cannot afford to miss the Convention.

Special features will be as follows:

1. Lectures by specialists of national reputation.
2. Demonstrations of the best methods of preparing poultry and poultry products for market.
3. Demonstrations of poultry houses and equipment.
4. Educational exhibit showing methods of successful poultry keeping.
5. An opportunity to visit the College poultry plant as well as the new museums.

Separate complete Program will be ready June 1 and may be secured by writing.

Wm. D. Hurd, Director of the Extension Service, or
J. C. Graham, Professor of Poultry Husbandry.
M. A. C., Amherst, Mass.

## SCHOOL OF ENGLISH FOLK SONG AND DANCE SUMMER SESSION

This school will be held at the Massachusetts Agricultural College, Amherst, June 30 to July 21, 1917, under the direction of Mr. Cecil J. Sharp of Stratford, England. Classes in Folk Songs, Children's Singing Games, Morris, Country and Sword dancing are held daily.

For information, circulars, etc., address Mrs. James J. Storrow, 417 Beacon Street, Boston, Mass.

### THE REGION SURROUNDING AMHERST

Amherst is one of the most delightful towns in New England, and has long been noted for the natural scenic beauties surrounding it, and as an educational center. It is located in the heart of the Connecticut valley. The Holyoke range, Mt. Tom, Mt. Holyoke, Mt. Toby, the Orient, the Connecticut River, Rattlesnake Gutter, Whately Glen, Old Deerfield and other places of great scenic beauty and historic interest are within easy walking, trolley or driving distance. The Berkshire and Hampshire Hills country is easily accessible.

The climate is good and usually not excessively warm during July.

The surroundings of the Summer Schools, the organization and methods of work, are such as to make a stay of two to four weeks enjoyable in every way. It furnishes the pleasantest sort of outdoor life, with just enough of work and recreation, under the simplest possible organization. From the first, special attention has been given to the outdoor exercises and recreation features of the program, and these will be still further emphasized in 1916.

## A COURSE FOR GARDEN SUPERVISORS AND CANNING CLUB DIRECTORS

A full four-weeks' course will be offered for those who are interested in garden supervision and canning club work.

### LOCATION OF AND DIRECTIONS FOR REACHING AMHERST

Amherst is ninety-eight miles west of Boston and twenty-five miles from Springfield. It can be reached from Boston over the Boston and Maine Railroad (Southern Division from North Station) or by the Boston and Albany Railroad from South Terminal Station via Palmer, thence to Amherst over the Central Vermont Railroad.

It may also be reached from Springfield or Greenfield by the Boston and Maine Railroad via Northampton, or by trolley from Springfield via Holyoke or Northampton.

From New York, take New York, New Haven and Hartford Railroad to Springfield, then to Amherst by train or trolley as already stated.

Persons coming from Albany, Buffalo and the West would best come to Springfield and then to Amherst as stated above.

For further information concerning the Summer School of Agriculture and Country Life, write

Andrew S. Thomson, in charge of Summer Schools,
Massachusetts Agricultural College, Amherst, Mass.

For details in regard to other Summer Schools write

Wm. D. Hurd,
Massachusetts Agricultural College, Amherst, Mass.

## THE MASSACHUSETTS AGRICULTURAL COLLEGE
### Summer School of Agriculture—1917

### Application for Registration

Name (Mr., Mrs. or Miss)....................................

Post Office.....................Street Address.................

State................Present Occupation.......................

Schools previously attended...................................

Reference (Name and address)...............................

.........................................................................

Name of person to whom word may be sent in case of illness or accident.........................................................

Address of above person.......................................

Consult the schedule and place an X **before** each course you wish to take.

COURSE
1 Soil Fertility
2 Breeds and Judging of Livestock
3 Poultry Breeding and Management
4 Fruit Growing
5 Vegetable Gardening
6 Amateur Flower Growing
7 Forestry
8 Civic Improvement
9 Bird Life
10 Insect Life
11 Beekeeping
12 Foods and House Construction

COURSE
13 Household Management
14 Sewing
15 Design and Practical Arts (1)
16 Practical Arts (2)
17 Organized Play and Recreation
18 The Community Drama
19 Plays and Pageantry
20 Elementary Agriculture
21 Rural Social Problems
22 Rural Organization
23 Social Morality

Send this blank to A. S. Thomson, M. A. C. Amherst, Mass.

I wish to take...............weeks' work, beginning.............

Room preference (read bulletin carefully)........................

(Do not fill in below)

Accepted.........................................................
Supervisor.

Date received............Fees..........Ref.....................

THE M. A. C. BULLETIN
AMHERST, MASS.

VOLUME IX SEPTEMBER, 1917 NUMBER 5

# MASSACHUSETTS AGRICULTURAL COLLEGE

## Supplement to the Catalog

Published six times a year by the Massachusetts Agricultural College.
January, February, March, May, September, October.
Entered as second-class matter at the Post-office, Amherst, Mass.

This pamphlet announces the calendar for the college year 1917—1918, new courses for regular students, rules governing the admission of unclassified students and certain courses prepared particularly for them.

Kenyon L. Butterfield, President,
Amherst, Mass.

September 25, 1917.

## CALENDAR 1917–1918.

1917
Oct. 10. Wednesday, 1:30 p. m. Fall Term Begins, Chapel.
Nov. 28. Wednesday, 12:30 p. m.—Friday, Nov. 30, 1:30 p. m., Thanksgiving Recess.
Dec. 15. Saturday, 12:30 p. m. Fall Term Ends.
Dec. 17. Monday, 7:30 a. m. Winter Term Begins.
Dec. 22. Saturday, 12:30 p. m. Christmas Recess Begins.
Dec. 31. Monday, 1:30 p. m. Christmas Recess Ends.

1918
Feb. 23. Saturday, 12:30 p. m. Winter Term Ends.
Feb. 25. Monday, 7:30 a. m. Spring Term Begins.
April 26. Friday, 5:30 p. m. Spring Term Ends.
April 27—29. Saturday—Monday. Commencement.

## DEPARTMENT OF MARKET GARDENING.

50. **II.** Offered in the second term instead of the third term.

51. **III.** Continuation of 50, II, for Juniors; 3 class hours, two 2-hour laboratory periods, credit 5.

Assistant Professor A. S. Thomson.

## DEPARTMENT OF ZOOLOGY AND GEOLOGY.

### Additional Courses.

**Conservational and Economic Zoology:—**

51. **II.** Conservational Zoology. — For Juniors; Seniors may elect. This course aims to bring before the student the great public problems of the conservation of wild life, especially the natural fauna of the state, and the more complete utilization of various forms of animal life on the farm projects. 2 class hours; one 2-hour laboratory period, credit 3.

Dr. Ball.

76. **II.** Economic Zoology.—*Birds in their Relations to Crops, Insects and Man.*—For Juniors and Seniors, Sophomores may elect. This course deals with the broad economic relations of the birds. The student is taught to know the birds, and their migrations and distribution.
1 class hour, two 2-hour periods, credit 3. Dr. Ball.

77. **III.** Economic Zoology.—*Birds in their Relations to Crops, Insects and Man.*—For Juniors and Seniors, Sophomores may elect. In this course the student reviews what is known of the specific food habits of our most important economic birds, carries his studies into the field, and gets an intimate acquaintance with our Massachusetts birds and their habits in relation to crops, orchards, woodlands and to each other. 2 class hours, one 2-hour laboratory period, credit 3. Dr. Ball.

## DEPARTMENT OF AGRICULTURAL ECONOMICS.

### New Courses and Adjustment of Present Courses.

78. **III.** Agricultural Credit Facilities.—For Seniors and Juniors. The legitimate use of credit in the production, storing and marketing of agricultural products. A brief survey of the development of credit institutions. National and state rural credit laws. Farm Land Banks, credit associations, and other means of securing personal credit. The topics will be discussed from the standpoints of dealers in agricultural produce, the landowning farmer, the tenant, and the farm laborer; special attention will be given to the credit needs of the college graduate. 2 class hours, credit 2. Mr. Wilkinson.

51. History of Agriculture, now scheduled in the first term, will be scheduled in the third term.

77. Problems, now scheduled in the third term, will be transferred to the first term, and be omitted in 1917—18.

75. Marketing.—This course will be offered in the fall term of 1917, but thereafter will be transferred to the third term, when it will become a Junior course numbered 53.

### Special Supervision Courses Offered in 1917-18.

These courses will be open to Juniors and Seniors for the purpose of more adequately preparing them for supervision work for next season. Each will consist of three lecture periods per week with a credit of 3. Any laboratory work required will be by arrangement.

**First Term:**

Control of Insect Pests: 2 weeks.

A thoroughly practical course dealing briefly with the essential points in the life history of the most important insects, with a full discussion of the best methods of controlling the same. There will be included a study of spraying apparatus and spraying materials.

Professor Fernald.

Market Gardening: 6 weeks.

1. Identification of common vegetables by seeds, by roots and foliage, about twenty to twenty-five species, including one to four varieties in each.
2. Technical demonstration and practice in preparing seed beds.
3. Technical demonstration and practice in planting seeds, bulbs, cuttings, and transplants.
4. Technical demonstration and practice in preparing germination boxes and raising young plants.
5. Technical demonstration and practice in cultivation.
6. Planning home and market gardens.
7. Study of the preparation for market.

Assistant Professor A. S. Thomson.

**Second Term:**

COURSES FOR AGRICULTURAL CLUB SUPERVISORS: 2 weeks.

1. The community and permanent organization of agricultural clubs.
2. The community and temporary organization of agricultural clubs.
3. Junior extension work—its history and purpose.
4. Methods of organization of community club work.
5. Methods of organization of club work.
6. Lectures on pig and poultry club work.

Professor HART.

SOILS.—6 weeks. Types and general characteristics, adaptability for different crops; manures, composition of fertilizers, methods of application, etc,: preparing soil for gardens, tillage implements, control of obnoxious weeds and grasses.

Associate Professor BEAUMONT.

**Third Term:**

DISEASES OF GARDEN CROPS.—2 weeks. Consideration of the more common diseases of garden vegetables, with opportunity in the laboratory to become familiar with their appearance. Three hours a week for 2 weeks. DEPARTMENT OF BOTANY.

ANIMAL HUSBANDRY.—3 weeks. Lectures will be given on the feeding, breeding, and management of all classes of livestock, with special emphasis upon the practical questions of the farmer and breeder.

Professor McNUTT.

PRESERVATION OF FRUITS AND VEGETABLES.—3 weeks. Methods of canning, dehydrating, evaporating, storage; when and with what crops to use the different methods; equipment for home and community plants; the organization of community enterprises.

Associate Professor CHENOWETH.

## BEEKEEPING.

The description of the courses now offered in Beekeeping was inadvertently omitted from the catalog of 1916–17. The following courses are offered:

60. BEEKEEPING.—Juniors; Seniors may elect. This course comprises a general consideration of the biology of the honey bee and the elements of practical beekeeping. Some topics covered are: life history, general behavior and instincts, structure, products, relations of bees to plants, the honey flora. The course aims particularly to afford first-hand, practical experience with bees, to the end of enabling their proper maintenance for any purpose, horticultural, educational or apicultural. Bee diseases, a thorough understanding of which is fundamental, are emphasized. So far as possible, the work is made individual in constructing materials and apparatus and in the manipulation of bees. 3 lectures, two 2-hour laboratory periods; credit 5. Associate Professor GATES.

80. Advanced Beekeeping.—Seniors; Juniors may elect. This course deals with the advanced and special problems of the beekeeper. Besides considering those difficulties which at present confront the industry, subjects necessarily of limited treatment in the previous course are expanded for the development of particular technique and manipulation. Apiary management, including the principles of queen rearing, is practiced. The course should further qualify for apicultural instruction and inspection service, affording familiarity with the special literature and methods needed in investigation and research. The policy of individual instruction is continued in so far as practicable. Prerequisite, Course 60; 2 lectures, one 2-hour laboratory period; credit 3.

Associate Professor Gates.

## WORK FOR WOMEN TO BE SUBSTITUTED FOR WORK IN MILITARY SCIENCE.

1. **I.** Elementary Microbiology.—For Freshmen Women. The course will be devoted to the various types of microorganisms, their distribution in nature and their characterization. Such methods as are essential for examination, manipulation and culturing will be studied and employed. 6 laboratory periods, credit 3. Dr. Itano and Mr. Ray.

In place of

Military 1, Tactics
Military 4, Drill
Fall Term, Freshmen.

3. **III.** Elementary Microbiology for Women.—Continuation of No. 1. 4 laboratory periods, credit 2. Dr. Itano and Mr. Ray.

In place of

Military 3, Tactics
Military 6, Drill,
Spring Term, Freshmen.

25. **I.** Personal Hygiene.—For Sophomore Women. Such subjects as the hygiene of the mouth and teeth, the gastro-intestinal tract, food, the skin, respiration apparatus, ear, eye and nervous system are reviewed. The value of bathing, clothing, physical exercise, etc., are considered. Attention will be given to emergencies, accidents of "first aid" and such other matters as usually fall within this category. 2 class hours, credit 2.

Professor Marshall.

In place of

Military 27, Tactics
Military 28, Drill
Fall Term, Sophomores.

27. **III.** Sanitary Science.—For Sophomore Women. The usual topics of sanitary science, as ventilation, heating, plumbing, water supply, sewage disposal, food control and communicable diseases, will be treated wholly from the standpoint of individual and public health control. 2 class hours, credit 2. Professor Marshall.

In place of

Military 27
Military 30
Spring Term, Sophomores.

Work in physical education, conducted by Mrs. Hicks, will be required 3 hours per week during the year.

## ADDITIONAL OPPORTUNITIES FOR GRADUATE WORK.

The degree of Master of Landscape Architecture is authorized in connection with graduate work offered in the Department of Landscape Gardening, and for this degree there is required one year's experience in addition to the period of one and one-half years in residence.

The degree of Doctor of Philosophy is authorized for major work in the Department of Agricultural Economics.

The degree of Doctor of Philosophy is authorized for major work in the Department of Rural Sociology.

## RULES GOVERNING THE ADMISSION OF UNCLASSIFIED STUDENTS.

Students not candidates for a degree (unclassified students) are admitted under the following provisions :—

1. All unclassified students are subject to the supervision of a special committee.

2. No applicant under 18 years of age will be admitted as an unclassified student.

3. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-year high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

4. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

5. Each unclassified student must take from the regular technical elective courses, and necessary prerequisites, a minimum of twelve credit hours a week.

6. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

7. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 60 per cent. An unclassified student who passes in less than 60 per cent of his work will be dropped from college.

8. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than six terms without the special permission of the faculty.

9. No unclassified student shall be allowed to participate in any intercollegiate contests.

10. Unclassified students are subject to the general regulations applying to classified students.

11. Every unclassified student should clearly understand that before any application for transfer to the regular registration for the B. Sc. degree will be considered by the Registrar, he must present all entrance credits either by certificate or by examination in the same way as is required of a student who enters regularly.

## SPECIAL COURSES FOR UNCLASSIFIED STUDENTS.

Unclassified students will enroll in these courses instead of courses bearing similar numbers in the catalog, and which are offered to regular students.

### Chemistry.

7. **I.** ELEMENTARY AGRICULTURAL CHEMISTRY.—Unclassified. This is a special course for unclassified students endeavoring to give in one term the essential facts and ideas of general chemistry and the chemistry of soils and fertilizers so that the student may be able to take up similar special courses in Agronomy. The course will consist of a brief study of important elements and compounds, followed by a special study of the chemistry of soils and fertilizers. Textbook, Tottingham & Ince, "Chemistry of the Farm and Home." This will be supplemented by laboratory notes. 4 class hours, one 2-hour laboratory period, credit 5.

Professor CHAMBERLAIN.

### Agronomy.

2. **II.** SOIL FERTILITY. Unclassified. A study of soils and their properties, manures, fertilizers and soil amendments. The principles and factors of soil management will be considered, together with the economical and practical means of improving and maintaining soil fertility. 3 class hours, one 2-hour laboratory period, credit 4.

Associate Professor BEAUMONT.

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MASSACHUSETTS

AGRICULTURAL COLLEGE

# GRADUATE SCHOOL

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# THE GRADUATE SCHOOL

OF THE

# Massachusetts Agricultural College

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## HISTORY

The Graduate School of the Massachusetts Agricultural College had its origin in a movement in 1892, when the Trustees authorized the conferring of the degree of Master of Science. Courses in mathematics and physics, chemistry, agriculture, botany, entomology, and veterinary science, were then offered. Owing to the requests of students, growing out of the opportunities furnished at this institution in entomology, graduate courses in entomology, botany and chemistry leading to the degree of Doctor of Philosophy were authorized in 1898. In 1908 the Graduate School was formally established with a director in charge; in 1912 the School was still further organized with definite provision for a graduate teaching staff. The graduate work has developed conservatively, and now includes many of the departments of the college.

## PURPOSE

To make men most efficient in any line, it is usually necessary to train them in a sympathetic environment which not only directs their effort, but encourages it toward a given end. Agriculture stands out peculiarly alone, and is in great need of such stimulating influences as will give it definite form and an intensive advancement. At present, there are at work social, economic and productive forces. To develop these properly requires special, intensive and extensive, and prolonged studies in each field of activity. Accordingly, to accommodate itself to the demands of agriculture in its broadest sense the Agricultural College undertakes to prepare men in social and economic sciences, in botany, chemistry, entomology and microbiology as they interpret agriculture, or in any other material basic science of agriculture; also in the various branches of agriculture (agronomy, live stock husbandry, dairying, poultry science, farm management, and horticulture, floriculture, landscape gardening, pomology, vegetable gardening and forestry), both from the standpoint of the science involved, and the art practiced. Men so prepared find service awaiting them in agricultural colleges and high schools, in normal schools, in experiment stations, in extension and field work, in the government service so widely operating in agriculture, in commercial positions, and in private agricultural enterprises.

## ORGANIZATION

Through organization, systematic and effective methods become available to the student. The Graduate School tries to deal personally with every student. In short, each man finds himself in the hands of a small committee, of which the chairman is the individual in charge of his major work, while the one or two other members are those having charge of his minor or minors. The chairmen of the students' committees constitute the Staff or Faculty of the Graduate School. It follows that every graduate student has practically a personal representative on the governing board.

The policy of the Graduate School is very conservative. It seeks to group about each competent instructor one, two or three students who will gain their training and development through personal contact and instruction. As in the earliest days of graduate work, now some centuries ago, it adheres to and emphasizes the apprenticeship system, as far as it is feasible. It will be gathered from this that quality, enthusiasm in the work, capacity and ability to work, comprise some of the characteristics which are highly prized by the instructors. Numbers do not attract them. Only those who can contribute to society special and distinctive service are welcomed.

## ADMISSION

Graduate work presumes that the undergraduate studies have been successfully pursued in an institution of at least the same rank as the Massachusetts Agricultural College. Graduates, therefore, from the Massachusetts Agricultural College and institutions having equivalent courses and standards, may enter the Graduate School. This, however, may not suffice, for unless the student is prepared to undertake effectively the graduate work offered in the departments selected by him for his major and minor, it may be requisite for him to take undergraduate courses deemed essential to the prosecution of the graduate courses. In this case, such undergraduate studies will not be recognized as part of the graduate course. If, in the opinion of the Graduate Staff, the undergraduate work of any institution falls short in any way of the undergraduate work of the Massachusetts Agricultural College, courses may be prescribed as prerequisite for undertaking graduate work.

When candidates for advanced degrees undertake to secure a mastery of their major and minor subjects, they frequently fail because of a lack of knowledge of German and French in their particular literature. This is regarded as inexcusable. The knowledge of the world can be made accessible to them in large part only through the medium of the English, German and French languages. Accordingly, students will be held accountable in this respect. A good working capacity in German and French will usually double the efficiency of English students.

College graduates may enter without becoming candidates for a degree, and pursue such work as is open to them. Under these circumstances, the students are subject to the regulations of the Graduate School and of the classes which they enter. Thus, provision is made by which it is possible for those with a college education to follow such work as may be especially valuable to them in their chosen field of agriculture, without undertaking a prescribed course of study over a period of time.

## GENERAL REQUIRED COURSE

In a technical institution there is a great tendency to place the limits of education within the circumscribed technical pursuits. Students fail to grasp the broader relations of life and to become appreciative of such thoughts and activities as contribute to its richness and fullness. In order to supply this real want in our educational system in this institution, especially for those whom we are training for experts in the Graduate School, a course has been outlined which will extend over three years. The students meet once each week for this period. The courses planned are as follows :

- Art
- Literature
- Philosophy
- Logic
- Social movements
- Philosophy of science
- Philosophy of practices

## GRADUATE WORK AT OTHER INSTITUTIONS

This institution does not lay claim to a position in which all courses necessary for the best and broadest training in various lines of agricultural education can be furnished. Nevertheless, it is the wish of every individual connected with the institution that the most comprehensive instruction be given. It is therefore urged, when courses required in the graduate plan can be followed more successfully at other institutions, that graduate students take advantage of this provision. The Graduate Staff will give such encouragement and help as is permissible. Work done elsewhere, if of graduate grade and pursued under the general supervision and knowledge of the Staff, will be recognized and credited as part of the graduate course of the student. It is hoped by this means to furnish the highest possible training to men who are aiming to equip themselves for some niche in the domain of agriculture.

## DEGREES CONFERRED

The advanced degrees granted as a result of conforming to definite courses of graduate study are Master of Science, Master of Agriculture, Master of Landscape Architecture, Doctor of Philosophy and Doctor of Agriculture. No honorary degrees are given. The requirements for these degrees, as stated in another place, are, in most respects, those of the highest institutions in the country. The aim is to maintain their integrity and dignity through high standards of efficiency. The degree of Master of Landscape Architecture is given after a prescribed course of study in Landscape Architecture.

## COURSES OFFERED

Courses available as major subjects for the degree of Doctor of Philosophy :

- Agricultural Economics
- Botany
- Chemistry
- Entomology
- Rural Sociology
- Horticulture
- Microbiology

Courses available as major subjects for the degree of Master of Science.

- Agricultural Economics
- Agricultural Education
- Agriculture
- Agronomy
- Animal Husbandry
- Botany
- Chemistry
- Entomology
- Horticulture
- Mathematics and Physics
- Microbiology
- Poultry Science
- Rural Sociology
- Veterinary Science

Courses available as major subjects for the degree of Master of Agriculture :

- Agronomy
- Animal Husbandry
- Poultry Science

Courses available as minor subjects for the degree of Doctor of Philosophy :

Agricultural Economics
Agricultural Education
Agriculture
Agronomy
Animal Husbandry
Animal Pathology
Botany
Chemistry
Entomology
Horticulture
Landscape Architecture
Microbiology
Poultry Science
Rural Sociology
Zoology

The course in Landscape Architecture leads to the degree of Master of Landscape Architecture.

Courses available as minor subjects for the degree of Master of Science :

Agricultural Economics
Agricultural Education
Agriculture
Agronomy
Animal Husbandry
Animal Pathology
Botany
Chemistry
Entomology
Horticulture
Landscape Architecture
Mathematics and Physics
Microbiology
Poultry Science
Rural Sociology
Veterinary Science
Zoology

## REQUIREMENTS

### I. Residence.

The period of residence fosters the spirit which is acquired by living in the atmosphere of an institution devoted to research, learning and practice, as well as to those broader features of life which contribute to the development of a man. So important is this regarded at the present time, that institutions are housing graduate students together for purposes of developing those influences which come from intimate association with each other as well as with those who direct and instruct. In an institution are to be found specialists who are in a position to assist by one means and another the student in attaining his desired end. All of the specialists brought together make a composite which should work for the fullest development. For these reasons, the time of residence is specified.

In the case of the degrees of Master of Science and Master of Agriculture, one college year, as a minimum, is exacted as residence at the College, and in the case of the degrees of Doctor of Philosophy and Doctor of Agriculture, three years of college residence, as a minimum, are required. This therefore implies that graduate students must conform directly to college supervision for the period stated.

### II. Courses.

There is wide latitude given in the selection of work. The graduate student should first decide whether he wishes to become a specialist in some particular field of social, economic, educational, agricultural, botanical, chemical, entomological, horticultural, microbiological, poultry or veterinary science, or in the general field of agricultural practice; whether he wishes to be a research man, a teacher, an extension worker, a commercial man, or a practitioner in agriculture. In other words, a student should not think of undertaking graduate courses until he has definitely found himself and has his objective clearly in mind. After this has been done, he should pursue his course persistently as experience has established it, and as it is laid down by instructors; besides, he should reach beyond established or arbitrary courses and enter the realms created by his own initiative and energy. He is in college as a graduate student to obtain what is already prepared for him, and to secure as much more as time and his own ability and capacity will permit. The mastery of his work is his ambition; the fullness of his character, his goal. His work should be so mastered that the knowledge and training secured will enable him to move ahead as a distinct agent in his chosen field, possessed both by the power of adjustment and creation. The growth of his manhood and of his moral and altruistic being in literature and art, in reasoning and decision, as well as in his chosen field of activity, should make for him a peculiarly useful place among men. While much of this requirement must be incidental to college life, it is nevertheless available to the student who is of the right temperament to undertake graduate study.

In striving for the degree of Master of Science, two subjects are specified, a major and one minor, which must be selected in different departments. In the case of the degree of Doctor of Philosophy, three subjects are selected, a major and two minors, no two of which may be selected in the same department. These degrees call for courses which will produce a specialist for some particular agricultural work or one who by scholastic attainments, mastery of a particular subject in all its bearings, and power of observation and originality, can not only contribute to the demands of society by means of instruction and counsel, but by production as well, and who can furnish new facts and ideas to mankind.

The degrees of Master of Agriculture and Doctor of Agriculture do not have the same objective as the degrees of Master of Science and Doctor of Philosophy. They stand for a professional aim and circumscribe a more extensive area, which is limited by such subjects and experience as will prepare a man to operate most effectively in some of the recognized divisions of technical agriculture. Subjects pursued may be particularly technical or scientific, but they must be such as are needed to instruct a man in his fullness to cope practically and successfully in some division of agriculture.

Members of the School who are not candidates for a degree are restricted only by their preparation to enter classes.

## A CONCISE OUTLINE OF MAJOR COURSES

All graduate courses are designed to fit men for some field in Agriculture.

1. Agricultural Economics.
    - (a) General economics
    - (b) The theory of agricultural economics
    - (c) Problems of agricultural production
    - (d) Historical and comparative agriculture
    - (e) Land tenure and land problems
    - (f) Problems of distribution of agricultural products
    - (g) Agricultural commerce, cooperation, legislation, credit, investigations

2. Agricultural Education.
    - (a) A study of present Massachusetts school laws
    - (b) Historical studies (educational)
    - (c) Educational psychology in its relation to physical, intellectual, and moral development; to embryology, anatomy and physiology; to studies in mental efficiency; and to teaching experience

3. Botany.
   (a) Plant physiology
   (b) Plant pathology
   (c) Normal and pathogenic metabolism
   (d) Plant evolution
   (e) Biologic relations
   (f) The ecology of plants
   (g) Physiological plant pathology
   (h) History of botany

4. Chemistry.
   (a) Advanced analytical chemistry
   (b) Advanced organic and bio-chemistry
   (c) Advanced theoretical and physical chemistry
   (d) Advanced inorganic and organic preparations

5. Entomology.
   (a) Morphology
   (b) Ecology
   (c) Economic entomology
   (d) Systematic entomology

6. Horticulture.
   (a) Floriculture
   (b) Forestry
   (c) Landscape Architecture
   (d) Market Gardening
   (e) Pomology

   Departments in which graduate work is offered.

7. Landscape Architecture.
   (a) Theory—The principles of esthetics as applied to landscape gardening
   (b) Design—The principles of pure design and their application in landscape and garden planning
   (c) Construction—The practical methods of carrying out landscape plans
   (d) Maintenance—Methods, organization, cost
   (e) Practice

8. Microbiology.
   (a) General
   (b) Special morphological, cultural, physiological
   (c) Soil microbiology
   (d) Dairy microbiology
   (e) Food microbiology
   (f) Hygienic and sanitary microbiology
   (g) Fermentation microbiology

9. Poultry Science.
   (a) Anatomy (gross and histological), physiology, pathology, surgery
   (b) Breeding
   (c) Feeding
   (d) Brooding
   (e) Incubation
   (f) Poultry diseases

10. Rural Sociology.
    (a) General fundamental studies
    (b) Special studies dealing with diseases, health and sanitation; standards of living; community conscience and social activities
    (c) Field studies
    (d) Organization and direction of rural forces with actual experience

The work of the above courses is pursued by means of assigned readings, seminars, conferences, quizzes, lectures, laboratory exercises, field operations, and research leading to thesis.

## III. Thesis

Attacking a problem is really an everyday experience—in fact, it is in its conclusions the result of the sum total of individual experience. In daily life, however, it is done successfully through a logical interpretation of experiences with the accumulated knowledge at immediate command; haphazardly through snap judgment; or not at all, through lack of thought. The solution of complex problems which will result in facts or an approach to truth, or in safe policies, is more serious, and requires that every factor involved be determined and its influence measured not only in its individual capacity, but also in its assembled relations. All available knowledge bearing upon the problem from the time of its inception as a problem to the present, must be critically reviewed and interpreted. Power to plan an attack from the deductions of literature, the elements concerned, and the methods employed; skill and training to conduct an attack in line with the plan and the many possible changes likely to occur; judicial ability or wisdom to analyze the results and synthesize the findings, must be in the possession of the individual. Research, therefore, calls for training, skill, knowledge, originality, persistency, good judgment or wisdom. A thesis is the substance of this attack in proper form for publication.

A thesis is required of all students working for the degree of Master of Science and Doctor of Philosophy, and must contain some evidence of the qualifications essential to its production. The thesis must be a real contribution to knowledge.

Three bound copies of each thesis in its final form must be submitted to the Director of the Graduate School before the candidate for the degree may take the required oral examination. One of the said copies is to be retained as an official copy by the said Director, one by the department in which the thesis was prepared, and one is placed in the Library of this institution. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis.

All theses become the property of this institution.

## IV. Final Examinations

For the degrees of Master of Science, Master of Agriculture, and Master of Landscape Architecture, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degrees of Doctor of Philosophy and Doctor of Agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the Faculty of the School.

## V. Time.

For the degrees of Master of Science, Master of Agriculture and Master of Landscape Architecture*, at least one academic year and a half must be devoted to the prosecution of the work. In the case of Master of Science, the major requires the earning of not less than fifty credits and the minor the earning of not less than twenty-five credits.

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* In the case of the Master of Landscape Architecture, one year in practice in addition to the above time is required before the diploma is granted.

For the degree of Doctor of Philosophy, three academic years must be spent on the work. Not less than one hundred credits must be earned in the major and twenty-five credits in each of two minors.

All time statements, however, refer to the minimum time recognized. They are not valid, should the student fall short in any particular at the end of the time stated. The purpose is to equip the man and to exact the amount of training necessary for this purpose, irrespective of time.

## GENERAL INFORMATION

### Expenses

No tuition is charged graduate students, nor are there laboratory fees in graduate work. The diploma fee for the degree of Master of Science, Master of Agriculture, or Master of Landscape Architecture is $10; for the degree of Doctor of Philosophy or Doctor of Agriculture the fee is $25. The living expenses for graduate students are much the same as for undergraduate students. Rent for furnished rooms in private houses ranges from $1.50 to $3.00 per week for each occupant. Board in the college dining hall is about $6 per week. Necessary books, stationery and miscellaneous items will probably not exceed $25 for the year. Laundry averages about 50 cents per week. Other expenses will be largely dependent upon individual tastes. A graduate student should find it possible to spend a year at this institution for $300 to $400 exclusive of personal expenses.

### Administrative

The statements in the regular college catalog relative to student accounts and student relations apply to graduates and undergraduates alike.

### Graduate Assistantships

A limited number of graduate students are given employment as assistants in the departments in which they major.

### Information

There will be found in the general catalog of the College the faculty list, a description of the undergraduate courses of study offered, the requirements for the degree of B. Sc., and information relative to the buildings and equipment of the institution. A copy of this catalogue will be sent on application made to the Secretary of the College.

KENYON L. BUTTERFIELD, A. M., LL. D.,
President of the College.

CHARLES E. MARSHALL, Ph. D.,
Director of the Graduate School.